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This Week in The IRON AGE

Vol. 156, No. 13 September 27, 1945

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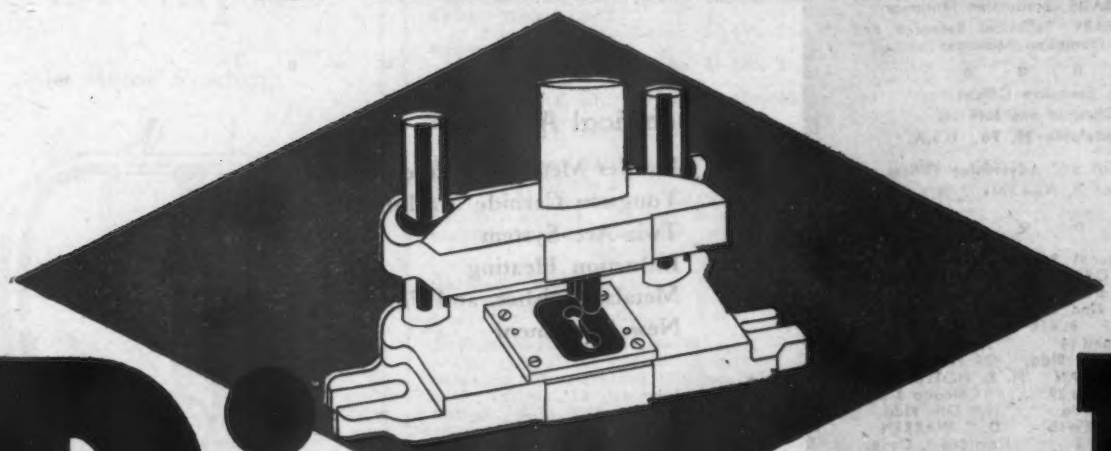
HERE IT IS Firth-Sterling's

original development of sintered carbide

for BLANKING and FORMING dies



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The IRON AGE

ESTABLISHED 1855

September 27, 1945

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Do Dreams Come True?

I DO not know how many of the readers of this page appreciate the virtues of a Limburger cheese sandwich, with onions, as a before midnight snack and sustainer. Before 90 pct of my readers involuntarily hold their noses, let me hasten to explain that olefactory refinements, advancing in pace with progress, have extracted most of the odor from this delicacy, to say nothing of its taste.

The point of this discourse, however, has nothing to do with either fragrance or flavor. I am thinking of that luscious combination purely as a maker of dreams.

Perhaps it was because I had been reading and hearing so much about the brave and bold plans of politicians and people on the public payroll for a new and better world at the expense of the employer and Uncle Sam, or perhaps it just happened so, but one night I dreamed that I read a want ad. A position wanted advertisement, to be exact. It read like this:

> POSITION WANTED—Owner of manufacturing business, now earning gross profit of $100,000 per year before taxes will exchange ownership interest for job with 40 to 50 pct increase in pay, as promised by Stabilizer Davis and 40-hr work week with vacation pay and guaranteed annual income as promised by Mr. Philip Murray. Address replies to Box 2,735,463, Iron Age, New York 17, N. Y.

Being on the inside, at least in my dreams, I looked up the name and address of the advertiser in our confidential files and found that he was Elmer Zilch of Ogowygo, Pa. Here was a lead that had to be followed by anyone with a nose for news, even in a somnambulent condition. Transportation being easy to arrange under these circumstances, I arrived at this historic town and eventually at the ivy and mortgage covered abode of Mr. Zilch.

I found him pacing the floor, gnashing his teeth, pulling out the few remaining hairs on his head and anointing himself with ashes in lieu of sackcloth which was on the restricted material list.

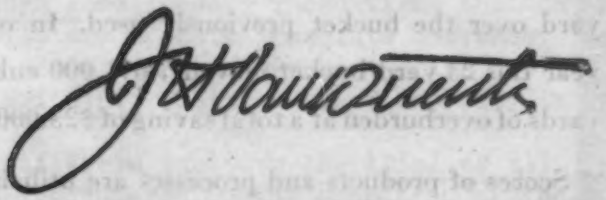
Under the circumstances, a direct approach seemed to be the best, so I showed him the ad, and said: "Mr. Zilch, how comes it?"

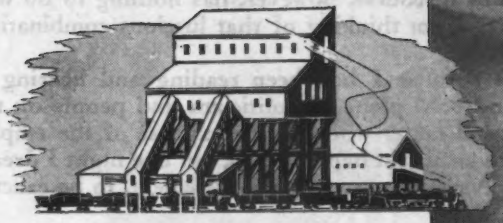
"How comes it?" he said. "Listen, I will tell you. A 40-hr week, is it, with 50 pct more pay! This week I spent not less than 30 hours arguing with the renegotiators from Washington. Twelve hours more I put in getting figures for income tax. Twelve hours more in getting ready to answer complaints from the labor unions. Six hours more filling out the forms for the WPB, the OPA, the XYZ and the PDQ. What time have I got left for sleep, let alone for running my business?

"And what do I get for running it, I ask you? Because I built this business out of earnings, instead of getting outsiders to invest in it, government takes 80 pct of my gross profits, plus what it gets through renegotiation. What I have left, after putting back enough to keep the business going, is less than I pay my foreman. And he's going to quit because the War Labor Board won't let me fire a guy working here who got lit on applejack and tossed him out of the window.

"Yes sir, Mister. Show me a job that will pay me the social security they are all talking about, a 40-hr week, vacations with pay, guaranteed annual income, and a year's sick leave with 75 pct pay and I'll swap my business for it as quick as you can say scat, in spite of the fact that I spent 40 years in building it and have made jobs for a lot of people."

I was glad at that moment to wake up and realize I was dreaming. For what would happen to this country if it were true would be just too bad.





This 23 yard Inland Hi-Steel bucket, at the right, saved $23,000 the first year.

$23,000 Saved . . . with Inland Hi-Steel

Facts and Figures Prove Advantages of Using Inland Hi-Steel Where Light Weight and High Strength are Needed.

The records maintained at Maumee Collieries show that when Inland Hi-Steel replaced material formerly used these important advantages were gained:

(1) The first cost was 40% lower.

(2) Maintenance was cut in half.

(3) Weights were decreased as much as 32%.

(4) Capacities went up an average of 51.6%.

The cost logic behind the use of Inland Hi-Steel was summed up by a Maumee official when he said, "We estimate that our 23 yard Inland Hi-Steel bucket saves three tenths of a cent a yard over the bucket previously used. In one year this 23 yard bucket moved 7,671,000 cubic yards of overburden at a total saving of $23,000."

Scores of products and processes are utilizing the corrosion-resistant, abrasion-resistant, high-strength and light-weight characteristics of Inland Hi-Steel. Write us if you would like further information.

Principal Products: Bars, Floor Plate, Piling, Plates, Reinforcing Bars, Sheets, Strip, Structurals, Tin Plate, Rails, Track Accessories. INLAND STEEL COMPANY, 38 S. Dearborn St., Chicago 3, Ill. *Sales Offices:* Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul.

INLAND
Hi-Steel

The Iron Age
Sept. 25, 1945

News Front

► Production of turbine plates for turbo-superchargers by Allis-Chalmers, contract for which has now been cancelled, provided the starting point for research on use of the lost wax precision casting process in a multiplicity of A-C products.

Shaft sleeves, brush holders, runner blades, tractor gears, turbo-blower and gas turbine blades all have been successfully manufactured by precision casting at the Milwaukee plant. A test model hydraulic turbine runner weighing 65 lb was precision cast in the laboratory.

► General Motors plants in Europe were 70 pct bombed out during the war. They will be put back into shape as rapidly as possible, and will resume manufacturing simultaneously with U. S. operations.

Probably about a tenth of the parts and subassemblies made in this country will allocated abroad, in line with steady prewar company policy.

► The tin shortage which Washington found so worrisome is unlikely to eventuate; industry people say requirements, particularly for automobiles, were overestimated; and supply from the Far East is now expected to flow faster than was presumed a mont ago.

► Auto union officials claim they can compromise their 30 pct pay raise demand whe ever they wish for 10 pct, although this is disputed by industry people. Indication are that the union would probably settle for once and for all at half of their 30 pc demand, but they face a determined fight before industry will give in to that exten or much less.

► Some talk is being heard abroad of internationalizing the Ruhr industrial valley of Germany. Meanwhile competent testimony is that the Ruhr is "pretty well spoiled" after the going-over it received from Allied bombers.

► A basic problem for industrial Europe is to get workers accustomed to producing prewar rates. So firmly has the habit become ingrained during the war of producing only enough in the occupied areas to get by the German overseers that a return to normal work habits is being found exceedingly difficult.

► Pittsburgh is watching with high interest the outcome of the first really big "white collar worker" strike in the country at Westinghouse. General expectation is that if it proves successful, it will touch off organizing drives in the front offic of other large industrial concerns in Pittsburgh and elsewhere.

► To add to the troubled labor situation, there are recurrences of the long-heard reports that John L. Lewis plans to enter the central labor body field along with CI and AFL, using District 50 of his United Mine Workers as a nucleus.

► Tungsten carbide has been successfully used as a metal for fabrication in machin parts subject to considerable wear. Cams, slides for machine tools and bearing surfaces of tungsten carbide are some of the new uses where the material has proved economical.

► Reports were revived this week that Chrysler is interested in building autos in the Dodge-Chicago aircraft engine plant. Use of the entire plant would involve an entire manufacturing plant because of its huge size, rather than just an assembly plant.

Earlier rumors indicated that Kaiser looked the operation over before settling o Willow Run, as well as Curtiss-Wright Lockland, and Consolidated Douglas.

► British are probably more shocked at the hasty way we ended the lend lease program, rather than surprised that it was ended. It will make a big difference in the overall export program.

In June 60 pct of all our exports were through lend lease. Those firms that hav counted this business in their export volumes will see a sharp immediate decrease.

► Six aircraft carriers which were originally converted from merchant ships are being used to carry grain from Canada to Great Britain. Their combined capacity is said to be 300,000 bu.

► Experimentation on an R-6 helicopter at Wright Field includes the trial of all wood blades in an effort to combat difficulties encountered in the operation of the fabric covered blades previously used on military machines.

Powder Metallurgy Precision Parts

. . . Wartime advances made in powder metallurgy have secured a strong competitive position for this process in the making of precision parts. In this article, the authors explore the postwar possibilities of new techniques, new products and new powder alloys and mixtures. Since one of the most fertile fields for this process is that of magnetic parts, a new sintered iron has been developed. This material is herein described and its coercive force and maximum permeability plotted.

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By R. HRADECKY
and
RICHARD P. SEELIG

Powder Metallurgy Corp.,
Division of General Bronze Corp.,
Long Island City, N. Y.

o o o

THE advantages gained by the use of precision parts made by powder metallurgy have been greatly demonstrated during the past few years. While there are some who would still consider sintered metal parts "pieces of pottery," the number of engineers who have introduced powder metallurgy parts in their assemblies and who have thereby saved money and valuable manhours is increasing steadily.

When the use of metal powders for the manufacture of oilless bearings, electrical contacts, sintered carbides and machine parts first became known, it attracted many promoters who in their enthusiasm over this new art exaggerated its claims and under-estimated its limitations. This trend retarded rather than accelerated the acceptance of powder metallurgy for critical wartime applications.

For other articles on powder metallurgy, see THE IRON AGE *issues of Jan.* 25, *Jan.* 18, *Feb.* 22, *Feb.* 15, *Feb.* 8, *Mar.* 22, *May* 17, 1945; *Dec.* 7, *Sept.* 21, *Sept.* 14, *July* 6, *June* 15, *June* 8, *June* 1, *Apr.* 27, *Mar.* 2, *Jan.* 6, 1944.

Nevertheless, some outstanding contributions were made by the powder metallurgy industry, and it is believed that some of these developments can be directly attributed to the stimulus of wartime requirements. It was possible in many instances to make products to the exacting specifications of the armed forces while in other cases new specifications for metal powder parts were adopted.

It is only natural that some of the wartime scarcities and difficulties under which the war production effort suffered during the initial stages of the program were particularly difficult to overcome in an industry which was in the transition from the pilot plant to mass production stage. This was the situation in the art of making mechanical parts by powder metallurgy and it was severely handicapped by scarcities like the lack of machines and skilled labor. The burden on key personnel in breaking in green help on operations which were novel and complicated was very heavy. The fact that the industry has made great progress and is turning out vast quantities of parts meeting rigid wartime specifications speaks well for the future of powder metallurgy.

The above-mentioned condition applied particularly to the production of non-porous parts for instruments, guns and numerous other mechanisms. Oilless bearings, brake and clutch facings, tungsten and tantalum products and the numerous other specialized products had already been well established and the increased demands were readily met by the industry. The following discussion is concerned mainly with the development of dense and intricate parts. By means of a few representative samples it will be shown that many gratifying advances have been made.

A piece which is really simple in design and which represents few production problems is shown in fig. 1. This is a part which could have been manufactured on a screw machine, but powder metallurgy eliminated waste of material resulting from boring the hole and turning the shoulder. In its outside appearance the part as made by powder metallurgy is hardly distinguishable from one which is machined from bar stock, except that instead of the annular machine marks it has very fine vertical mold marks. Its density is slightly below that of rolled stock, but pores are not visible to the naked eye.

The part shown in fig. 2 is some-

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FIG. 1—This simple part represents few production problems. Although it could have been made on a screw machine, powder metallurgy eliminated waste of material resulting from boring the hole and turning the shoulder.

what more complicated. Yet, it could be fabricated comparatively easily by milling bar stock and then cutting off to suitable widths and drilling the hole. In powder metallurgy, this part can be pressed with all the outline dimensions to tolerance and including the hole to within 0.002 in. in relation to the flat reference surface. This part is made from a composition which can be called steel. It is heat treated in a manner quite similar to that used on any ordinary low-carbon steel so that its hardness ranges from 35 R_c to 45 R_c. Thus, this part has very excellent wearing properties without too much sacrifice in impact strength.

The bronze part shown in fig. 3 is a little more complicated. In addition, a special material was used to give the part properties which cannot be incorporated by any other method. This was done by making it

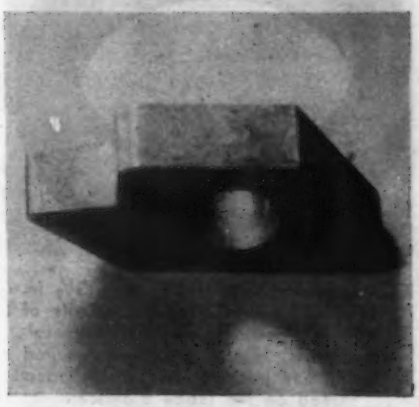

FIG. 2—This part can be fabricated comparatively easily by milling bar stock and then cutting off to suitable widths and drilling the hole. In powder metallurgy, it can be pressed with all outline dimensions including the hole held to a tolerance within 0.002 in. in relation to the flat reference surface. Made from a composition which can be called steel, it is heat treated to a hardness of 35 Rc to 45 Rc.

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with less than full density and impregnating the pores with oil. As a result, this sliding member had self-lubricating properties in an assembly which was inaccessible from the outside.

The part in fig. 4 is of bronze and could have been stamped. It is 2½ in. long, However, it turned out that even with conventional operations following the stamping, the required tolerances could not be readily maintained. Stamped blanks also require expensive tooling and slow broaching operations. By the use of powder metallurgy which, of course, involves expensive tools also, great accuracy was combined with speed of production. It may be mentioned that the width of the slots and the diameter of the hole all were held to an extreme tolerance of 0.0003 in. total variation. Needless to say, such tolerances cannot be held except under very carefully controlled conditions. These then have to be maintained during all steps of production,

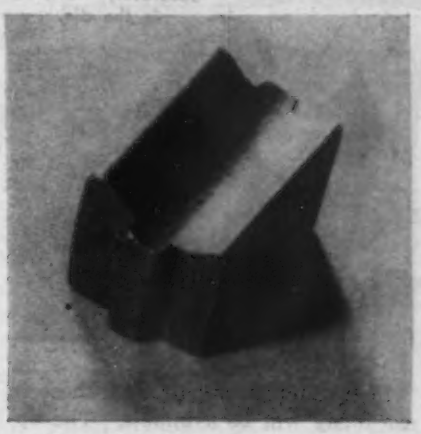

FIG. 3—By making this bronze part with less than full density and impregnating the pores with oil, this sliding member has self-lubricating properties in an assembly which is inaccessible from the outside.

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a factor which reflects itself in the final cost of the part. In spite of all this, substantial savings were realized. Caution is in order, however, when quoting such tolerances and it should be emphasized that in the majority of the parts produced by powder metallurgy, such close tolerances cannot be held economically. This has to be decided in each individual case, as it depends on the shape, size, material and other factors.

The pole piece shown in fig. 5 combines very desirable magnetic properties with economy in manufacture. Close tolerances are, of course, important because clearances have to be accurate and uniform in order to maintain constant calibration in the instrument for which these pole pieces are made. Although the magnetic properties produced are not actually superior to those of special materials otherwise obtainable, the latter are unusually difficult to machine, and this is where powder metallurgy offers its advantage. An interesting feature in this part is that it contains two holes which have to be held to ±0.001 in. in relation to one another. As a result, it turned out that it was better to mold only one of the holes in the dies and drill the other in relation to it from a spot accurately located in the die. This spot is formed in such a way that it fully supports the drill and does not permit it to run out. This obviates the necessity of using a drill jig and the resulting economies of this setup are apparent.

Whereas the parts described so far were all of relatively small size, the part in fig. 6 measures 3⅛ in. in diameter. This size is well within the limits of economical production of powder metallurgy parts. The particular piece illustrated is a structure member of a shock absorber, and the only operation required after it has left the dies is cutting a thread on the inside diameter. The part in fig. 7 is of bronze and its complexity makes it one of the most interesting as an example of what can be done with dense powder metallurgy. It has a groove on one side and a rib on the other which cross each other at 90°. The angular relationship was important. In addition, the width of the rib had to be held to very close tolerances. Furthermore, the part contains two blind end holes on one side. Because of these features, several handling and set-up operations would have been required if this part were to be produced by machining.

Fig. 8 illustrates a steel part having blind end splines on the one side and blind end keyways on the other, representing quite a problem to a machine shop. Even in powder metallurgy, this was not an easy piece, but once the tools had been designed, production started at a rapid rate.

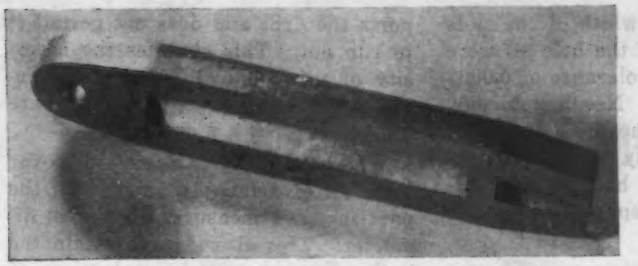
In summarizing these illustrations, it can be said that the development shows a trend toward better properties, larger quantities and more intricate shapes. With this trend in mind, the future promises to expand the fields of application of such parts in all industries.

Exploration of New Products

With victory in the Pacific, powder metallurgy will spend much more time for the development of new products and the experimental application of new methods. Various specialties such as new powder alloys and new mixtures for special uses will be developed under much more favorable conditions.

Some of the new techniques that are being discussed in theory today will certainly become an accepted part of production routine. Hot pressing, for instance, looks like a difficult but helpful development when the industry has the time and trained manpower available to make experimental work possible.

The application of side pressure, in the fabrication of intricate parts, is



ABOVE

FIG. 4—This bronze part could have been stamped, but by the use of powder metallurgy great accuracy was combined with production speed. The width of the slots and the diameter of the hole were held to an extreme tolerance of 0.0003 in. total variation.

BELOW

FIG. 5—This pole piece combines very desirable magnetic properties with economy in manufacture. Only the hole shown was molded in the dies; another one was drilled from a spot accurately located in the die.

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another probable postwar development. This will cut down the necessity for machining even more than in the past and will put this industry in a still stronger competitive position.

The use of cores in molding metal powders has some limitations at present. Setups and die designs are too expensive. One may look for more improvements here when powder metallurgy gets into postwar production.

Many automatic devices that will raise production and lower costs will become available. Some of them are still on the drawing boards, while others are in the experimental stage. One such improvement, now in the experimental stage at the writers' plant, promises to increase production 400 pct.

While on the subject of production speed it might be well to point out that, although powder metallurgy is fast and economical, speeds have been grossly exaggerated by irresponsible writers. Pressing metal powders into dense parts takes longer than pressing pills, candies and even porous bearings where less pressure is used and tolerances are wider.

Only the first step in powder metallurgy has been discussed so far—that is, molding the parts. The second step is sintering, which also promises some great postwar improvements. New furnaces will appear in powder metallurgy plants after this war which will make today's production achievements lose most of their significance. Much experience with furnaces is being gained in war production. Many opportunities for improvements are becoming apparent. There is such a volume of work being sintered that there are daily opportunities to see where improvements can be made.

Higher temperatures than those in use today will be available. The application of new and different controlled atmospheres will also have a tremendous future bearing on quality and cost. There is a question whether the use of city gas as a basis for furnace atmosphere is most economical or sufficiently effective for the best results. There are still many things to be desired in the quality of the parts that are being sintered in this type of atmosphere.

Powder Metal Magnets

New and better types of gases are now being developed for postwar use. Some of these are for special treatment and are expected to eliminate many of the present bugs in powder metallurgy.

Even though one may not be completely satisfied with today's methods and equipment, there is much cause for encouragement when looking back to the early days of powder metallurgy. When comparing the crude tools used by Walliston in producing his platinum briquets and then recalling the application of dies in powder presses for the manufacture of oilless bearings or other new products of that time, one can really appreciate the present high speeds resulting from improved equipment and better die design. Rapid strides really have been made in the production of better products at a greatly increased rate of production. Thus, it is a reasonable assumption that the new postwar improvements in powder metallurgy will more than offset the new economies that machine tools will offer.

There are, of course, the many old and new products that powder metallurgy can offer which could not so readily be made with machine tools or by any other known methods. One of these is the famous Alnico magnet. Many tools for the medical and dental professions are being made by powder metallurgy methods exclusively because they require special alloys that cannot be duplicated in the foundry. Other products that can be produced only by powder metallurgy are brush holders, brake linings, and carbide tool bits because in these, metallic and non-metallic substances are combined.

Pole pieces used in instruments of intricate design can still be made from materials other than metal powders, but the magnetic properties required and the higher cost of producing these parts by conventional

FIG. 6—The size of this part, 3⅛ in. in diam, is well within the limits of economical production of powder metallurgy parts. Only operation required after it has left the dies is cutting a thread on the inside diameter.

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methods give powder metallurgy a distinct advantage in this field.

The chemical and electrical industries use certain items requiring the employment of the rare elements. These can be produced by powder metallurgy alone.

Tungsten lamp filaments and high temperature resistance coils are some more examples of exclusive powder metallurgical products as are also magnetic cores for high frequency application which combine the use of metallic particles insulated by non-metallic coatings.

There are various other distinct advantages offered by powder metallurgy in the manufacture of electrical products. One of the foremost of these is the maintenance of high purity in the material by the elimination of gas inclusions, surface oxides or sulphides and other impurities that would normally find their way into the ingot if it were cast by the usual foundry methods. Combinations of

refractory metals with metals of a lower melting point can be made by mixing the powders in the cold state and then compacting them in briquets. This method eliminates the inherent disadvantages that are present in cast ingots. Powder metallurgy does more than eliminate impurities in the combining of metals with widely divergent melting points. It also overcomes the loss by vaporization which conventional methods would cause in some case. The possibilities of combining metals and other materials in powder metallurgy are almost endless.

The principle of porous structures has been applied with signal success to the fabrication of metallic filters that are used for highly corrosive liquids. Further developments toward temperature and acid resistant filter materials may be expected.

Powder metallurgy manufacturers have become so advanced in the fabrication of dense intricate metal parts that these methods of production are sure to supplant much of the orthodox fabrication of these parts from bar stock castings with expensive machinery. The scarcity of foundry facilities and machine shop equipment during this war caused many manufacturers to turn to powder metallurgy for this type of part. This gave the powder metallurgy industry an opportunity to demonstrate in a field which had hardly been touched in peacetime.

FIG. 7—Because of the complexity of the bronze part shown here, several handling and setup operations would have been required if it had been produced by machining.

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The result of a great deal of wartime experience in the manufacture of dense intricate parts has been very gratifying from both the quality and volume angles. It is an accepted fact today that high density can be attained and close tolerances held over a long run in modern powder metallurgy production. It has also been proved many times that the much greater rate of speed in this type of production and the almost complete elimination of waste combines to effect new economies.

Gears, various intricate machine parts, parts for guns and special bearing parts have been turned out by powder metallurgy in tremendous quantities to help the war effort. They have been used by those manufacturers who turned to powder metallurgy for speed, precision, and high standards of quality. When these same manufacturers reconvert, they will know where to go for the speed, economy, and quality that a changeover under new competitive conditions will necessitate.

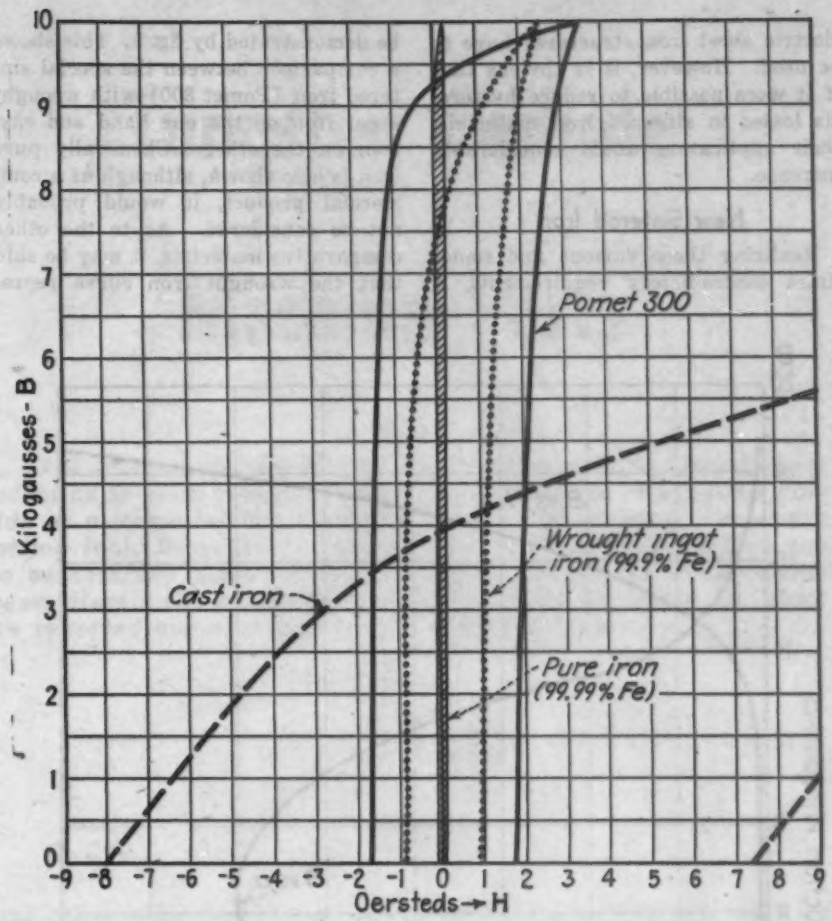

FIG. 9—Comparison hysteresis curves for special sintered iron (Pomet 300) with wrought ingot iron and cast iron. Chemically pure iron while shown would probably not be used as a commercial product.

FIG. 8—A part like the one shown here with blind end splines on one side and blind end keyways on the other represents quite a problem to a machine shop. Even in powder metallurgy, this is not an easy piece, but once the tools are designed, production starts at a rapid rate.

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The use of powder metallurgy for the creation of magnetic parts is only in its infancy. Designers are realizing more and more that they can obtain high efficiency from parts made from magnetic iron powders. Only slight variations in the design of their instruments are necessary to make the advantages of powder metallurgy possible.

The following data give a comparison of the permeability results obtained from such materials produced in the writers' plant and from other materials.

Important features required in iron used for magnetic applications include low residual magnetism and high permeability. Low hysteresis and eddy current losses are not always important. Where eddy current losses are a major factor, laminated

electric sheet iron structures have to be used. However, it is obvious that if it were possible to reduce hysteresis losses in sintered iron materials, their application would considerably increase.

New Sintered Iron

Realizing these various and sometimes contradictory requirements, a new sintered iron has been developed. This should not be confused with the powder metal core materials which consist of insulated powder particles and which are designed for small hysteresis and eddy current losses, nor is it similar in composition or technique to the high permeability materials known under the trade name of Permalloy. The material described here is the result of research designed at duplicating the characteristics of pure iron by the powder metallurgy process. It turned out to be a material of considerable commercial importance. Its characteristics can best be demonstrated by fig. 9. This shows a comparison between the special sintered iron (Pomet 300) with wrought ingot iron on the one hand and cast iron on the other. Chemically pure iron is also shown, although as a commercial product, it would probably not be considered. As to the other comparative materials, it may be said that the wrought iron curve represents a good grade of this material; cast iron is sometimes used for pole pieces but, of course, it is not a good magnetic material and its curve is partly outside of the scale used in the diagram.

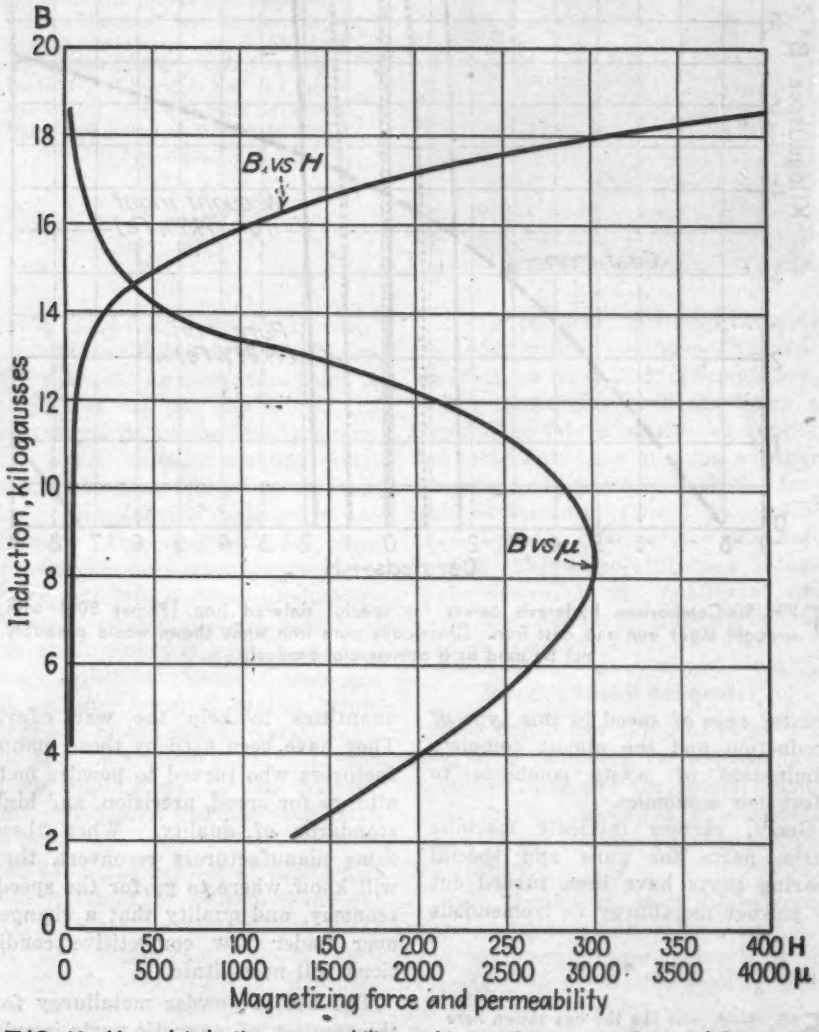

FIG. 10—Normal induction, permeability and saturation curves of special Pomet 300 sintered iron. While it falls into the same range as wrought iron, it runs much higher than cast iron. Maximum permeability is reached for an induction of approximately 8300 gausses.

In order to show that the development of this magnetic iron constitutes a definite step forward, a comparison with ordinary powder metallurgy irons is shown in the following table presenting data for coercive force and maximum permeability.

	Ordinary Powder Metal Iron	Special Sintered Iron (Pomet 300)
HC (oersteds)	Over 2, in some materials as high as 4	Approximately 1.7 and lower
μ max	Approximately 2300	3000 and higher

The normal induction curve for this material is shown in fig. 10. It shows that the special sintered iron described here falls into the same range as wrought iron and that it runs much higher than that of cast iron which it has replaced in some applications. The same diagram also shows a permeability curve. It can be seen that the maximum permeability is reached for an induction of approximately 8300 gausses.

This material has been described as an indication of a trend in the field of powder metallurgy. It shows what can be done by properly selecting raw materials and careful production control in the way of desirable magnetic characteristics. The importance of maintaining high chemical purity was recognized. Moreover, the structure of the metal influences its magnetic properties in the same general manner as in ordinary magnetic irons. As a result, a new technique had to be developed for processing this sintered iron. Porosity, although not entirely eliminated, has been reduced to a satisfactory degree.

The result then is a material which is well suited for many applications. It is not claimed that its properties are superior to those produced by ordinary materials. However, the powder metallurgy technique permits it to be manufactured into finished pole pieces, cores, and armatures, economically, as there is little or no machining involved.

One very hopeful sign for the future success of powder metallurgy is the increased activity within the various engineering societies for standardization of specifications and materials in the powder metallurgical field.

Recognition has been given to the field in that the American Society for Testing Materials, American Society for Metals, and the American Institute of Mining & Metallurgical Engineers have created committees for the purpose of establishing specifications, standardizing nomenclature, encouraging basic research and exchange of thought in powder metallurgy. Results of their efforts will be evident in due course.

Several universities have established powder metallurgy courses and are now conducting experimental investigations in their laboratories. Re-

(CONTINUED ON PAGE 132)

Tungsten Carbide Machine Parts

. . . The increase in manufacturing facilities and the concomitant reduction in price makes possible the application of tungsten carbide as a metal for fabrication in addition to its former use as a cutting tool. Experiments have proved that tungsten carbide can be successfully used for machine parts subject to considerable wear. Herein the results of such trials at the Carboloy Co. plant are reported and new uses for the material suggested.

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By S. H. BRAMS

Detroit Editor, THE IRON AGE

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CONSIDERABLE experimental work has lately been undertaken in using tungsten carbide for machine parts where wear is considerable and critical. Cams are one such example. These must be held extremely accurate where they are guides for grinding, turning or boring machines. Carbide wafers or bits reduce wear on the cams to infinitesimal proportions, and entire cams have been successfully and economically produced of carbide.

Tungsten carbide also finds a new place on ways or slides of machine tools. Because tungsten carbide can now be produced in long strips, it is very well adapted to such uses, and improved methods of fabrication of tungsten carbide also make it possible to fasten such long strips to cast iron or steel beds without cracking or warping. An example of this kind of installation is found in a Wickman profile grinder in operation at the plant of Carboloy Co. in Detroit.

These grinders, fig. 1, are used for the finish grinding of carbide-tipped form tools, employing diamond wheels with pressures much higher than those required for grinding steel. Inasmuch as extreme precision is required for grinding form tools, no looseness in spindle or ways of the grinder can be permitted.

The wheel spindle of the Wickman is carried on a vertical slide that reciprocates vertically at either 40 or 80 strokes per min; the higher speed is used almost exclusively when grinding carbide. Length of stroke is adjustable, with maximum stroke about 3 in. Grinders are used throughout two 8-hr shifts per day.

Cast iron ways were originally used on the vertical slide, and these wore to such an extent that they had to be removed and hand scraped back to a plane surface once every six months. The gib in the ways of the vertical slide in each machine had to be adjusted every 24 hr to maintain required accuracy.

Solid Carboloy dovetail ways and wear strips were installed on one Wickman grinder. The ways consist of two upright dovetails, each about 9¾ in. long, 1 in. wide, and ½ in. thick. On one side of the head there are two carbide inserts; on the other side there is an insert and a tapered gib. Inserts and gib bear directly against the dovetails. The carbide inserts are 8½ in. long, 1 in. wide and 3/16 in. thick. Thus, all bearing surfaces are of solid Carboloy cemented carbide. Oil grooves are ground into the surfaces of the carbide sections. Machine oil fed by gravity from oil cups is used.

The carbide ways have been in continual use for more than seven months

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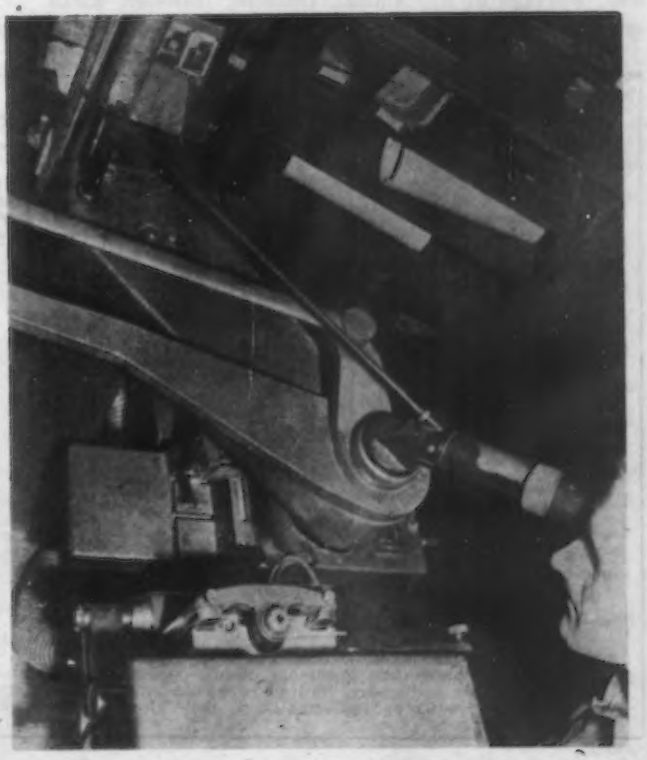

FIG. 1—This bird's-eye view of a Wickman profile grinder in use at the Carboloy plant in Detroit shows the top of the vertical slide, of carbide, on which the wheel spindle reciprocates. Since carbide was installed in place of cast iron more than seven months ago, there has been no appreciable wear.

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on two 8-hr shifts per day. No sign of wear has been detected as yet. The gib was adjusted once after running for 30 days, but since then, no further readjustment has been necessary.

In this respect, it should be noted that substitution of carbide for steel in such installations might serve to reduce area required for ways, and thereby make possible the simplification of machine design.

Carbide Bearing Surface

Another test installation at the Carboloy Co. using tungsten carbide in a new medium is a bearing surface, a job providing really unusual food for thought on bearing theory. As is well known, accepted practice is to use a soft metal—babbitt, lead, silver or some other—as the bearing, put in contact with a shaft of very hard metal, so the soft metal can adapt itself to the contours of the hard metal. Some efforts were made to combine hard metals on both surfaces, such as steel, but scoring and galling resulted and the parts often froze. But the theory of using hard metal against hard metal is vindicated when tungsten carbide is employed, as is proved by the installation at Carboloy.

This development is on a standard Dumore toolpost grinder, fig. 2, used for production grinding of the internal and external surfaces of cemented carbide die nibs. Diamond wheels are used on the grinding operation. Pressure between wheel and work is about ten times that normally used with abrasive wheels on Dumore grinders, producing considerable overload on ball bearings of a standard Dumore spindle.

Grinders give excellent service under normal conditions, even when run at the maximum spindle speed of 10,000 rpm. At Carboloy, however, Dumores are run on heavy load for two 8-hr shifts per day. Standard bearings would run accurately for about a week, then show signs of wear, and the shaft would develop a small amount of play. Once started, wear increased rapidly until new ball bearings had to be installed.

Solid Carboloy bearings with both cylindrical and conical bearing surfaces were installed at each end of shaft, fig. 3. The inner bearings—of Grade 44A Carboloy—are attached to shaft with Woodruff keys. The inner bearing at the wheel end of shaft is held in position against the shoulder by a spacer. The inner bearing member at the pulley end of shaft is bored so that a close slip fit on the shaft can be obtained. The inner bearing is held tightly against its mating outer bearing by means of a compression spring and spacer tube. The outer bearings are stationary and assembled in the housing with a light press fit. They are of a different—78B—grade of Carboloy metal.

The outer or bearing surfaces of each inner bearing member are grooved for lubrication. The conical bearing surfaces take the bearing load. Cylindrical portions of bearings may have a running clearance of 0.0005 to 0.0008 in. A mixture of colloidal graphite and kerosene is used for lubrication. A few drops are placed in a small cup which permits the lubricant to reach the bearings through wicks.

The carbide-to-carbide bearings on the Dumore grinders have been in service on two 8-hr shifts per day for more than a year at the present time. Examinations have showed about 0.000004 in. wear during that time. It is now thought that Carboloy bearings will outlast conventional steel ball bearings about 50 to 1 on this application.

Carboloy has made experimental ball bearings of tungsten carbide, and have also done interesting work with sleeve bearings. The latter type of application is particularly promising since the greater bearing load which tungsten carbide can support has permitted the use of smaller bearings, resulting in more compact design.

Of course, the use of tungsten carbide for plug, thread, ring and other gages is too well known to merit any lengthy discussion in this survey. Suffice it to say that tungsten carbide gages have made it possible to reduce going tolerance limits on finely machined parts to a level somewhere around 0.0002 in., rather than the accepted prewar "fine machining" standard of 0.0005 in.

Consumer Applications

Tungsten carbide had found a limited number of consumer applications before the war, and these likely will be expanded after the war. Probably the best known consumer application of tungsten carbide was in fish-rod guides, as a replacement for agate, eliminating wear and corrosion and providing greater strength, while at the same time eliminating breakage.

Some valve applications may be improved by use of tungsten carbide.

Physical Properties of Some Commercial Cemented Carbide Compositions[1]

Composition	Density G Per CC	Rockwell Hardness, A Scale	Transverse Rupture, PSI	Young's Modulus,[2] PSI x 10^6	Compressive Strength,[3] PSI	Proportional Limit in Compression,[4] PSI	Impact Strength,[5] Ft-Lb	Endurance Limit,[6] PSI	Coefficient of Thermal Expansion[7]
97 WC pct, 3 Co pct	15.25	92.7	170,000	97.5	815,000	780,000	.....	.....	.....
95 WC pct, 4.5 Co pct	15.05	92.3	200,000	90.5	890,000	740,000	.....	.....	.....
94 WC pct, 6 Co pct	14.85	90 to 92	225,000	88	750,000	600,000	0.73	95,000	5.0×10^{-6}
91 WC pct, 9 Co pct	14.60	89.5 to 91.5	275,000	83	685,000	540,000	.....	.....	.....
87 WC pct, 13 Co pct	14.15	87.5 to 90	300,000	80	625,000	525,000	1.10	105,000	5.9×10^{-6}
80 WC pct, 20 Co pct	13.55	85 to 87	350,000	73	550,000	425,000	1.75	.....	.....
Predominantly WC, with TaC and 13 pct Co	13.90	87 to 88	275,000	88	610,000	475,000	.....	.....	7.25×10^{-6}
Predominantly WC, with TaC and 6 pct Co	14.70	9 to 92	220,000	91	752,000	670,000	0.65	85,000	.....
Predominantly WC, larger amount of TiC, 7 pct Co	9.00	9 to 93	150,000	88	725,000	.....	.....	.....	7.0×10^{-6}
Predominantly WC, with TaC and TiC, 8 pct Co	11.7	91.5 to 92.5	165,000	72	720,000	.....	.....	.....	6.75×10^{-6}
Predominantly WC, with TaC and TiC 11 pct Co	11.6	90.5 to 91.5	175,000	81	680,000	.....	0.60	85,000	6.0×10^{-6}

[1] The values given in this table are representative of properties obtained in good production practice. They are not necessarily the highest obtainable, nor do they represent the lowest which are of practical use.
[2] Most values for Young's modulus were obtained by W. H. Davenport of the Norton Co., by the musical pitch method.
[3] Most of the values for compressive strengths are given through the courtesy of P. W. Bridgman of Harvard University.
[4] Proportional limit in compression is the load per unit area at which the increase in strain ceases to be directly proportional to the increase in stress.
[5] Impact values are from unnotched specimens approximately ¼ in. square section; Charpy machine was used.
[6] Values for endurance limits are based on 20,000,000 cycles, for specimens of R. R. Moore rotating beam type.
[7] Average coefficient of expansion, per °C for the range 20° to 700°C (68° to 1290°F).

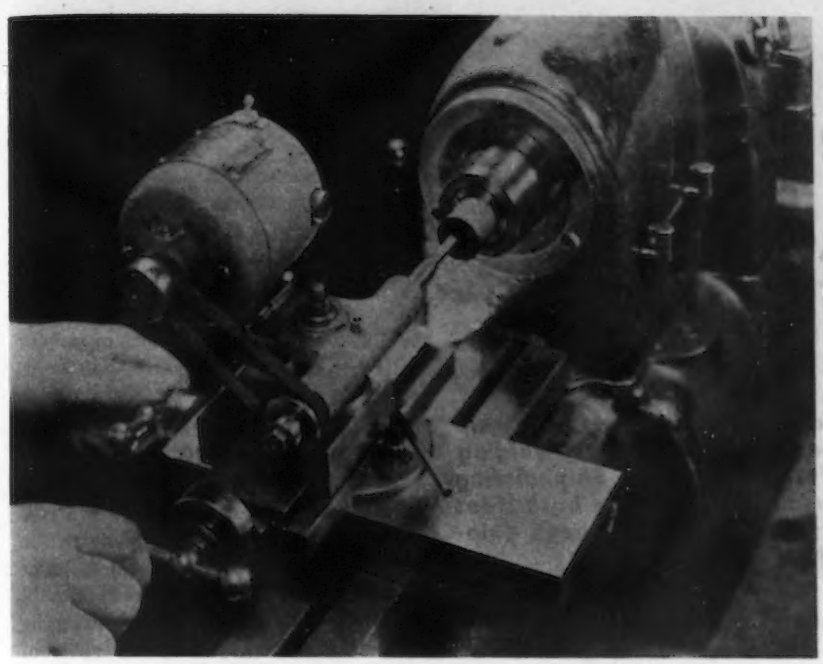

FIG. 2—This standard Dumore toolpost grinder is fitted with solid tungsten carbide bearings with conical bearing surfaces installed at each end of the shaft.

FIG. 3—A closeup of the tungsten carbide bearings employed in the Dumore shown in fig. 2 is here illustrated. Wear after a year of use is still measurable only in millionths of an inch.

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One such might well be for expansion valves for the refrigerant in refrigerators. It is easy to make such valves to close limits in bronze, but the problem is to maintain the size over a sufficient period to back up the 5-yr guarantee on many of the mechanisms. The long wearing qualities of tungsten carbide make it a good nominee for use in this kind of installation, and furthermore the carbide will not corrode under the etching effect of the refrigerant, as do other metals.

Rotary gas seals in refrigerators may be made of tungsten carbide. Hitherto the washers have been made of nitrided steel, but the desirability of permanently sealing such devices may dictate a change, again, because of the greater wear resistance of carbides.

Carboloy anticipates development of a definitely low-priced masonry drill of carbide for drilling in tile, concrete, plaster-wall, glass and other materials. Hopes are to make this tool so cheap so that when it wears—as it will not do for many thousands of holes—it will simply be discarded by the user rather than resharpened, inasmuch as resharpening presupposes fairly expert craftsmanship generally lacking among such users.

Another consumer device of carbide might well be a kitchen knife sharpener. One such sample has been built, consisting simply of a triangular rod extrusion of carbide mounted in a wooden handle. The knife blade to be sharpened is drawn across one of the edges once or twice and, in actuality, is simply whittled down to a sharp edge.

The lowered prices of carbide achieved during the war which will make possible such volume applications can, in a circle of improving efficiency, produce further economies. The volume inherent in mass production goods as against the more orthodox applications in tool bits is amply demonstrated in the case of armor piercing shell cores. These cores for the 75 mm guns weigh four lb each. A volume of only 50,000 of these, requiring 200,000 lb of tungsten carbide, would be equivalent to some 6 million tool bits weighing between 11 and 15 g apiece!

High Tensile Electrode Developed

DEVELOPMENT of a new arc-welding electrode, designed to forestall underbead cracking in the welding of high-tensile steel plate such as that used for certain classes of ship construction, has been announced by Metal & Thermit Corp.

The new product is an all-position, mineral-coated electrode with a less penetrating arc than the so-called hot rods. At the same time, it is said to provide weld metal having high tensile strength with ductility and X-ray soundness equal to that produced by downhand electrodes.

Because it minimizes pick-up of undesirable elements from the parent metal and prevents cracking and porosity in the weld, the new electrode is stated as being found particularly useful in welding so-called dirty steels, as well as high-carbon, high-sulphur and cold-rolled steels. In many cases it has replaced more expensive stainless steel electrodes.

Successful applications to date have included:

Welding of high-sulphur, free-machining steel, without cracking or porosity in the weld metal.

Welding of spring-steel plates containing 0.90 to 1.1 carbon, without any detectable cracking.

Watertight welding of Holliday Speedcase Steel, analyzing — 0.2 carbon, 1.25 manganese, 0.02 phosphorus, 0.25 sulphur and 0.03 silicon.

Welding of cold-rolled steel and cold-rolled to mild steel.

The new electrode is marketed under the name of Murex HTS Electrode.

Twin-Arc System Improves Welding Efficiency

. . . Warping and residual stresses in the welded joints for ship plates have been materially reduced by the Twin-Arc welding technique developed by engineers of the California Shipbuilding Corp. The various passes are made simultaneously from both sides of the joint, cracking of the root pass is avoided, and back chipping eliminated.

By M. H. MacKUSICK

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California Shipbuilding Corp.,
Wilmington, Calif.

ALMOST all welding specifications and codes have in the past required that in making a 100 pct weld in a grooved joint, the first root pass shall be applied from one side of the plating, and that the second or opposite side be back chipped before the weld is completed on that side. Recent investigations by welding engineers of the California Shipbuilding Corp., however, have shown that when Twin-Arc welding is employed, back chipping is not necessary to produce complete fusion of the root passes which are welded from the two sides, provided accurate spacing is obtained in fitting up the grooved joint.

As the name implies, "Twin-Arc" welding is a system whereby two welders apply their root passes simultaneously from opposite sides of the joint, the one electrode or arc trailing the other by only a few inches. If the trailing arc fuses into the joint from the opposite side while the base metal and joint still retain an appreciable amount of heat from the leading arc, substantially less stress is established, and added penetration of the trailing arc is obtained. The overall quality of the weld is substantially improved, and the welding operating efficiency, i.e., the ratio of manhours to footage, raised some 30 to 40 pct.

With proper control of fitting tolerances an appreciable saving in cost is realized, since the lengthy chipping operation is eliminated and the total amount of weld metal required per unit length is reduced. With conventional methods, all the material removed by back chipping must be replaced by welding. More important, however, than either time or cost saving is the fact that the safety of the weld is improved, since with Twin-Arc welding the tendency towards cracking at the root pass is materially reduced. When two root pass welds are applied at the same time, fewer heating and cooling cycles are imposed on the material and fewer stresses thereby induced. A single root pass of weld metal will frequently crack due to lack of sufficient depth of weld metal to withstand the contraction stresses. This is especially true if a long run of root pass is applied before filler passes are added to build up the body of the weld. If an uncompleted weld is left overnight without the reinforcement of several filler passes, root pass cracking is liable to occur, particularly if the root pass has been made during the warm daylight hours and the entire structure cools during the night to several degrees below the temperature at which the weld was made. These conditions are very prone to exist in shipyards where most of the welding is out-of-doors, and overnight temperature changes of 20° to 30° are not unusual.

On the basis of more than 1500 ft of production welding tests, California Shipbuilding Corp. engineers have established standard procedures for the use of Twin-Arc welding on

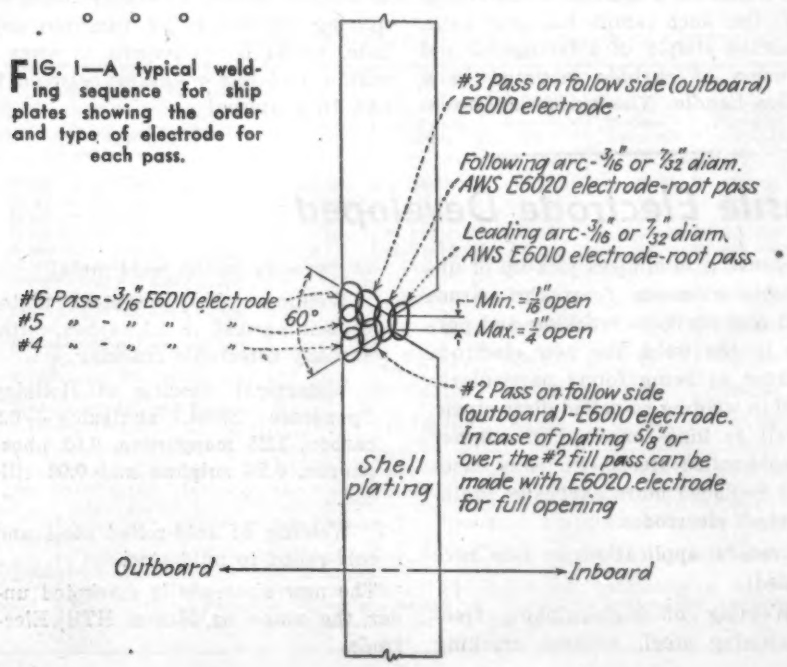
#3 Pass on follow side (outboard) E6010 electrode
Following arc-3/16" or 7/32" diam. AWS E6020 electrode-root pass
Leading arc-3/16" or 7/32" diam. AWS E6010 electrode-root pass
#6 Pass-3/16" E6010 electrode
#5 " - " " "
#4 " - " " "
60°
Min.=1/16" open
Max.=1/4" open
#2 Pass on follow side (outboard)-E6010 electrode. In case of plating 5/8" or over, the #2 fill pass can be made with E6020 electrode for full opening
Shell plating
Outboard
Inboard

FIG. 1—A typical welding sequence for ship plates showing the order and type of electrode for each pass.

all horizontal butt welds. The joint is to be prepared with a 30° double bevel on both sides, and any land remaining at the root opening may not exceed the width of the root opening itself. It has been found desirable to fit up the work so that the root is not less than 1/16 in. wide, nor more than ¼ in. wide. On ship plates the leading root pass is made on the inboard side using AWS Class E 6010 electrodes of either 3/16 in. or 7/32 in. diam depending on the weight of the plates. The following pass is made on the outboard side with AWS Class E 6020 electrodes. All filler passes are made with E 6010 electrodes although, if desired, the second pass on the follow or outboard side may be made with E 6020 electrode if the plate thickness is ⅝ in. or more.

The most desirable burn-off rate for the E 6010 electrodes used on the leading arc has been found to be between 8 in. and 10 in. per min for a 3/16-in. size, and between 7 in. and 9 in. per min for the 7/32-in. size. As the gap increases on the fit up the burn-off rate should be decreased correspondingly. The rate of travel will depend on the fit-up gap. For the following arc, using the E 6020 electrode, the burn-off rate should be between 8 in. and 11½ in. per min for the 3/16 in. size, and between 10 in. and 12 in. for the 7/32 in. size. The burn-off actually used must be decided by the fit up, which influences the amount of penetration of the first pass on the lead arc side. The recommended travel speed is from 8 in. to 9 in. per min.

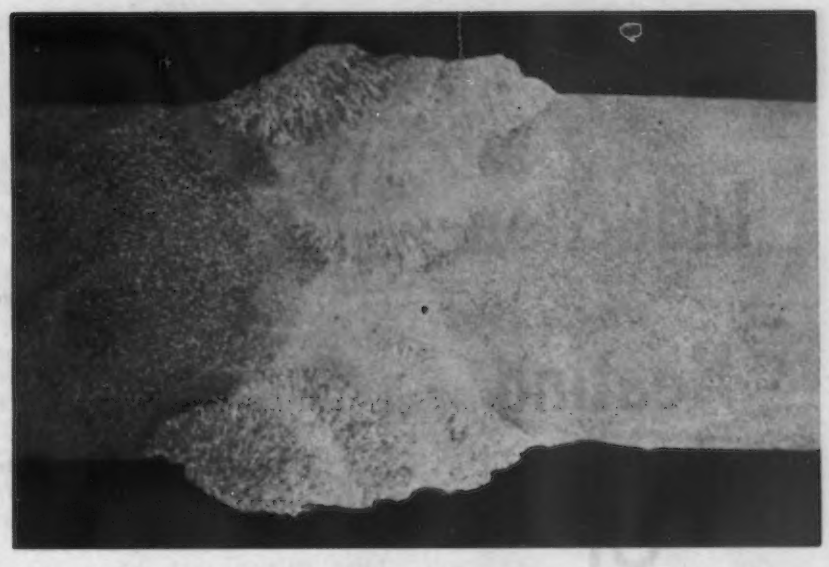

FIG. 2—Photomacrograph (3X) of a Twin-Arc buttweld showing the high quality of the work performed by this method.

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When converting to this type of welding it is advisable that operators be properly instructed in the technique. Back chipping is, of course, eliminated, but it is important that the scale from the lead root pass on the inboard side be raked off on the back side prior to the follow pass of the E 6020 electrode on the outboard side.

Twin-Arc welding has proved its effectiveness over a considerable period of time, and while originally developed for shipyard work appears to offer many advantages for general application. Not only are costs reduced, but the plating will remain much flatter when shrinkage of two simultaneous root passes occurs on either side of the plate than would be the case when the plate is welded and cooled at separate intervals from each side.

New Threading Technique

DEVELOPED originally for use on the hydrostatic fuse of depth bombs, an interesting new method of making threads has been perfected by the Toledo Stamping and Manufacturing Co., Toledo. As first designed, the depth setting sleeve and adjusting bushing were produced by machining from solid brass bar or forgings, but to meet the increasing demand for these parts, the Toledo firm was given the job of redesigning for mass production on presses.

The depth setting sleeve was redesigned to be made from 0.089 in. hot-rolled sheet steel, SAE 1010, and was fabricated in seven drawing and two annealing operations. The thread itself was formed from cold-rolled strip steel edge rolled to 0.446±0.003 x 0.100 in. thick. The ID of the sleeve was held to +0.005, —0.000 in. and the accurately formed coil inserted into it. A series of spot welds held the thread in position prior to copper hydrogen brazing. (See Illustration.)

The adjusting bushing was made in the same manner by drawing from 0.1046 in. sheet steel in five drawing and one annealing operation, and applying the helical strip to the OD. (See illustration.)

In addition to greatly speeding production and saving critical materials, the stamping technique has reduced manufacturing costs approximately 50 pct, and although adopted as a war measure there could well be peace time applications where close accuracy of threads is not required. The thread helix may be made from strip metal, as in this example, or from wire of any suitable diameter.

Induction Heating Of Small Parts

By SEWARD A. COVERT
Assistant to the President, Ohio Crankshaft Co., Cleveland

. . . Because high frequency current has only shallow penetration, induction heating is particularly well suited for the heating of small parts. In this article various applications of high frequency hardening and annealing are described.

WHERE specifications call for hardening, annealing, brazing or heating in the forming or forging of small ferrous or nonferrous parts and limit that heating to selected areas on the part, exceptional results have been achieved by the application of induction heating. Split-second control and accurate concentration of heat contribute to the success of this method.

Induction heating authorities note a definite rise in the use of high frequency for heat treatment of small parts even though they are frank in their opinion that where through heating is required, methods other than induction may offer greater economy. In many cases, however, because of its scale-free characteristics and its negative tendencies to distort the induction process can be used to advantage even there.

Underlying this increased use appears to be the greater ingenuity found in the design of inductors and fixtures plus the availability of equipment that provides a dependable source of ultra high-frequency current. Bearing heavily upon this latter point is the fact that the higher the frequency the more shallow is the depth of its penetration; a phenomenon known as "skin effect" that makes it possible to work with thin-wall parts which could not be heated successfully by other methods.

New interest in induction heating is being evidenced by manufacturers of consumer products into which go small parts. Some of the products for which postwar experimentation has been done include typewriters, sewing machines, lawn mowers and automobiles.

When a metal part is exposed to the magnetic field of an inductor through which high frequency currents are flowing, that part not only acts as a conductor of these currents but it also has an electrical resistance to this flow of energy. Thus, induction heating can be compared to straight resistance heating (I^2R heating) which is responsible for the generation of the heat.

The rate of heating decreases with time as the electrical resistance to the flow of the current increases with temperature and since the action is confined to the surface layers, only that portion is affected. A continued application of power, however, causes an increase in depth of heating for as each layer of steel is brought to temperature, the current density shifts to the layer beneath, as resistance is lowered. As already intimated, it is important to note the relationship between frequency and diameter of stock treated, for this relationship bears directly upon the induction hardening of small parts.

A ½-in. diam bar heated with 2000 cycles would heat throughout its entire cross-section with very little surface hardness resulting. Treated with 9600 cycles, a depth of surface hardness approximating 0.80 in. is obtainable while with excessive power input per unit of surface area or with higher frequencies a shallower depth can be effected.

A ¼-in. diam bar heated with 2000 cycles would not heat high enough to achieve hardness upon quenching. However, it would prove satisfactory for annealing or low temperature drawing. Heated with 9600 cycles, the bar would be heated sufficiently for hardening but the hardness would be through rather than surface. To surface harden would require radio frequencies.

An ⅛-in. diam bar could not be effectively heated to hardening temperatures with 2000 cycles although with 9600 cycles sub-critical annealing or drawing could be accomplished. A frequency well above 100,000 cycles would be in order for surface hardening such material though there seems to be no practical reason for doing this. In the following table additional information on depth of hardness is given.

Minimum Depths of Hardness

Frequency, Cycles Per Sec	Approximate Minimum Practical Depth of Hardness, In.	Approximate Theoretical Depth of Penetration of Electrical Energy, In.
3,000	0.060	0.035
9,600	0.040	0.020
120,000	0.030	0.006
500,000	0.020	0.003
1,000,000	0.010	0.002

The figures in this table show the absolute minimum depth of hardness for production work.

Induction Heating for Forging

Installations of induction heating for forge shop use have resulted in outstanding reductions in time and material. The speed of the induction operation coupled with its freedom from scale, its controlled heating, and longer die life are causing changes to be noted in forging practices.

An interesting example is the experience of the Lett's Drop Forge Co. of Detroit in making parachute

FIG. 1—On this 100 kw, 9600 cycle induction unit, one worker is heating 3½-in. parachute snap blanks for forging while the other worker is feeding them to the 1500-lb hammer at the rate of one snap every 7 sec. Localizing the heat prevents distortion of the flange during shaping.

snaps. These 3½-in. snaps were formerly heated in a combustion type furnace prior to forging which resulted in a completely heated piece. When the blank (see fig. 1) was placed in the hammer for shaping, the blow was such as to bend the flange end in piece after piece and to create excessive rejects. Adopting induction heating by installing a 100 kw, 9600 cycle, Tocco Process unit, Lett's heated the snaps for a distance of only 2¾ in. or to a point just above the union of the flange and the hook. Then placed in a 1500-lb hammer, the snap was formed without any distortion of the flange.

A surprising increase in production occurred to boost the daily total to 4200 hooks an 8-hr day as compared to 2200 formerly obtained by the older method, and where three men were formerly required the work is now done by two.

By the count, induction heating raised from 18,000 to 32,000 the number of pieces obtained from one set of dies before a change had to be made. This 77 pct increase in die life had a salutory affect on operating costs.

Snap blanks are conveyed by a novel fixture comprising a series of transite blocks each containing a slot and attached to an endless belt driven by an electric motor. Into the slot in the blocks is placed a snap, flange down and at right angles to the conveyor belt. The blanks move ahead through a hairpin type inductor at the rate of one every 7 sec after which they are picked up with tongs and delivered to the hammer man.

Complete control of the heating cycle results in uniformity of quality and similarity in hook after hook. The flashing is trimmed and the blank is knocked out of the strap loop to complete the snap.

The Allen Mfg. Co., Hartford, introducing induction heating for quick forging of cap screws was able to

FIG. 2—Exhibition Tocco unit displaying automatic fixture for heating 3 in. long by ⅝ in. diam slugs for upsetting. This 30 kw, 9600 cycle unit is similar in action to that delivered to Russia. A slug heated to 2000° F drops out every 9 sec from the machine pictured. Heat is restricted to the upper third of the slug after it slides down into the inductor.

FIG. 3—Small parts treated by induction heating. At left is a radio tube component 7/32 in. OD by ½ in. long made of nickel which was annealed to prevent cracking when the end was flared. The wall of these tubes is only 0.050 in. thick. Five hundred kc were used. In the center is a sewing machine thread bobbin assembly. The upper collar and the two lower projections were hardened successfully when a 450,000-cycle frequency was used. At right is a piston, 17/32 in. long by 7/16 in. OD. A specified tolerance of 0.0005 in. was finally met without rejections by adopting induction hardening of the piston surface.

utilize bar stock ½ in. smaller in diameter than previously used while operating time dropped from 90 to 21 sec per screw. The new method conserved metal, and because of the concentration of heat, operators found gloves unessential.

Formerly the cap screws were machined from 4⅜ in. long x 1½ in. diam bar stock which was turned down ½ in. leaving the full diameter for the head. Time was 90 sec.

Introducing a 60 kw, 9600 cycle induction unit the smaller bar was heated for forging in 13 sec when placed in a simple water-cooled inductor. Quickly moved to a heavy-duty forger, the head was upset in 8 sec with three passes, making a total forming cycle of only 21 sec.

As induction forging applications become more widespread, the process is being adapted for the manufacture of automotive and aircraft valves both in domestic and foreign plants.

A typical installation feeds bars to a shear after which the ⅞ in. diam by 1⅜ in. long slugs are passed through a coil for heating for extrusion. Automatic and synchronized with press operations, the 9600 cycle induction heater discharges 2000 slugs per hr heated to 2100° F directly to the press.

A Russian installation of a 15 kw machine heats ⅜ in. diam by 10 in. long steel rods to 2000° f over 4 in. of stock in 6 sec. Immediately upon heating the piece is conveyed to the press for forming a valve head on the rod.

A novel gravity-fed fixture holds a reserve piece above the inductor while another is heating. As the heating cycle ends the hot piece is released by the lifting of an automatic stop. The stop falls again and the clamp holding the reserve piece trips to allow the piece to slide down a chute into the inductor whereupon heating commences (fig. 3).

Carbide Tip Brazing

Induction brazing of carbide tips to cutting tools is a simple operation calling for a single inductor which loops over the end of the tool to concentrate the heat on the tip and the recess in which is the soldering material. Heating cycles run from a few seconds upwards to a minute.

Requiring not more than a 15 kw capacity induction machine, it is possible to treat large quantities of tools per hour. Small half inch diamond dressing tools for straight or radius dressing, can be brazed in quantities of 150 to 200 tools per hr. by one operator after the diamonds are positioned in the matrix. In one commercial plant it is reported that two girl operators working on a two station machine have turned out 85, 1¼ in. x 1½ in. tools an hr in contrast to 80 produced in an 8-hr day by other methods.

Surface Hardening

Dramatic example of a truly small part successfully hardened by radio-frequency induction is a 17/32 in. long by 7/16 in. OD piston for servo mechanisms equipping airplanes (fig. 4). A highly precise part, specifications called for a finish of the connecting rod and bushing assembly with limits of 0.0005 in. tolerance.

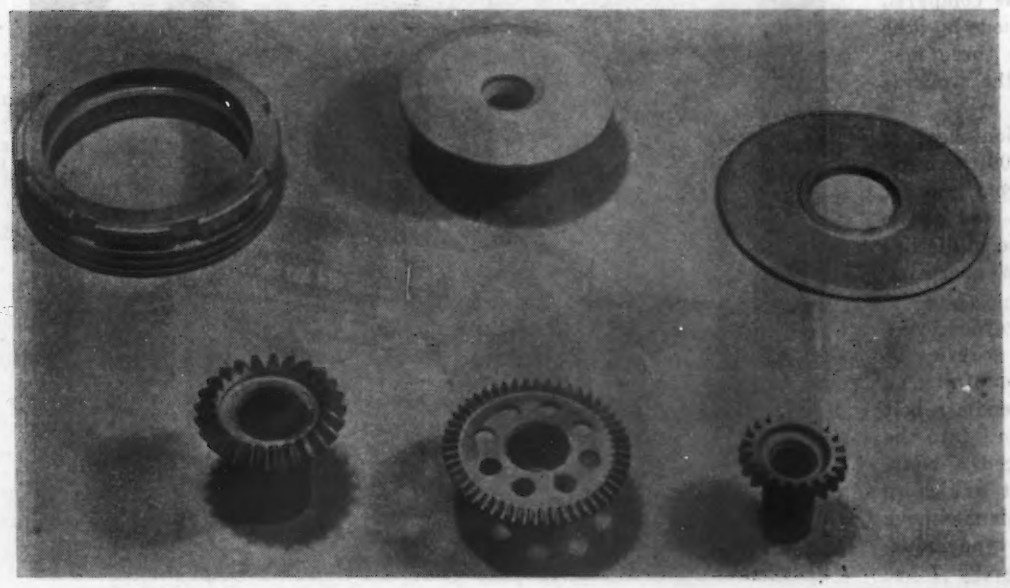

FIG. 4—Small parts for aircraft engines treated by induction heating. The bevel gear located left and front is annealed within the lower areas of the bore to develop a uniform hardness that improves machining of an internal spline. The part is approximately 2¼ in. OD with a bore of 1¼ in. ID.

This requirement brought about complications when the parts were carburized, and it made for many extra operating steps.

Originally the piston was machined oversize from bar stock, carburized and then machined again to remove the carburized sections from those areas where hardness was not desired. Allowed to remain on the piston was a carburized band some 10/32 in. long encircling the piece down from the head end of the piston. This was hardened by conventional methods before the connecting rod recess had been drilled and the 0.050 in. thick wall formed.

High-Frequency Annealing

Upon adoption of induction hardening the whole process of fabrication was simplified. Using a 20 kw, 450,000 cycle unit, it has been possible to adopt a carburized bar stock of size from which the piston is machined to finished design in one operation instead of the three previously required. Then the parts are hardened to 63 Rc, two at a time, from the head end down over an area some 5/16 in. in length, leaving the remainder of the piece soft enough for crimping after the connecting rod is installed. Following induction hardening, the pistons are finish ground.

With a process cycle of 1½ sec. heat ½ sec. delay and 2 sec. quench, the one station induction machine can turn out upwards of 800 pistons per hr.

Still experimental but indicative of what is to come is the hardening of a 1⅛ in. OD by ⅝ in. long sewing machine thread bobbin assembly. A complicated piece in design, the bobbin has been successfully hardened along a 1/16 in. wide collar and at two points projecting from the rim. The part made of SAE 1112 steel was carburized before induction treatment (fig. 4).

Placed in a simple inductor block on a 450,000 cycle machine the bobbins are heated by the use of 4 kw of power to 1500° F in 5½ sec. with a 1-sec. delay and a 2-sec. quench to complete the cycle.

For annealing small parts induction appears to be a natural, for here again the ability to put the heat where it is wanted on a given piece is the answer to many a current metallurgical problem.

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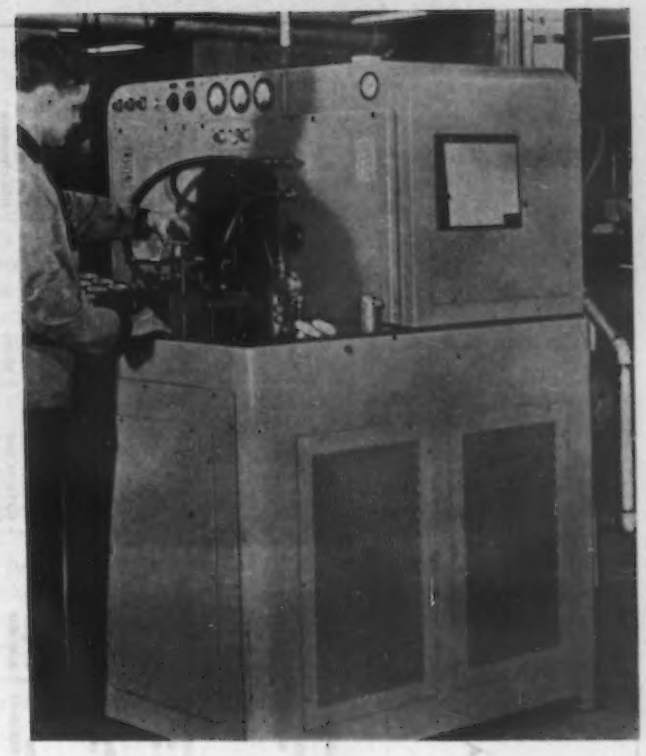

FIG. 5 — Operator positioning the small bevel gear in fig. 4 in the inductor of the 450,000-cycle Toccotron. As the heat is restricted to the lower end of the bore and a quick cooling quench follows heating, operators do not wear gloves or use tongs. The quench sprays up from beneath the inductor.

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In the Nash-Kelvinator aircraft engine division the matter of broken broaching tools had caused great inconvenience in the cutting of internal splines on a 2¼ in. OD bevel gear having a bore approximately 1¼ in. ID extending through a hub 2 in. in length (fig. 5). The spline, ¾ in. long, is cut in the lower end of the bore.

To prevent carburizing the bore surface during the overall carburizing of the piece, it had been the practice to copper plate that area. However, leakage of carburizing gas occurred through the plating to create hard spots in the section to be machined. It was this nonuniformity that injured the broaching tools and which induction treatment corrected.

A simple inductor block mounted on a 450,000-cycle tube set of 20 kw capacity (fig. 6) heated the spline end of the bore to some 1000° F. restricting the heat to the ¾ in. spline area and holding the penetration to a depth of 0.025 to 0.040 in. A total heating cycle of 3.4 sec. which included 2 sec. for heating and the remainder for a handling quench sufficed and imparted a uniformity of softness that eliminated the former cutting troubles.

Still experimental but revealing the potentials of high-frequency heating is an annealing application that treats small nickel tubes, 7/32 in. OD by ½ in. long, designed for radio tube components. With a wall thickness of 0.050 in. they can be heated at a rate which could turn out 72,000 per hr., although one particular need is only 10,000 daily (fig. 4).

Tubes grouped in racks holding 40 to 100 units pass through a hairpin type of inductor at the rate of 20 per sec. They are heated at one end only to 1500° F to relieve stresses and to prevent cracking when cold worked to form a slight flare at the end.

The size of the tubes calls for an average optimum use of 500 kc.

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TABLE XXVIII

COMPARATIVE DATA, ARMY AND NAVY SPECIFICATION, LACQUERS AND ENAMELS

Specification Number	Thinning Lacquer; Thinner	Application Methods	Drying Time	Cold Water Resistance Time	Unleaded Gasoline Resistance (65 Octane)	Flexibility	Durability	Name	Purpose	Surface	Processing
U. S. Army Air Corps 14105-B Bulletin 41	2:1; Spec. AN-TT-T256	Spray, 50 to 60 lb, brush, dip	Air dries	18 hr	18 hr	Two coats over primer and bake at 212°F, bend over ⅛ in. mandrel every 24 hr for four days	Six months summer exposure	Cellulose nitrate lacquer pigmented	Aircraft camouflage	Anodized aluminum and other metal parts	Two coats over zinc chromate (AN-TT-P-565a)
3-163	None	Dip	Air dries 30 min	24 hr	—	—	Heat resistance on silver plate at 204°F or over is 2 hr	Clear lacquer	Landing lights	Silver plate	Direct application over silver plated reflectors
14109A	4:1; AN-VV-N-96 type II	Spray, 50 to 60 lb	Air dries 60 min	18 hr	Aliphatic naptha 4 hr	Bake at 212°F for four days, bend over ⅛ in. mandrel	six months summer exposure	Enamel	Aircraft camouflage	Anodized aluminum, etc.	One coat over zinc, 1 hr between coats
U. S. Navy Aeronautical M-485-C	2:1; AN-TT-T-256	Spray, 50 to 60 lb	Air dries 10 to 15 min	18 hr	18 hr	Bend over ⅛ in. mandrel	Six months summer exposure	Lacquer non-specular	Aircraft exterior surfaces and insignia and marking	Anodized aluminum alloys	Two coats over zinc chromate (AN-TT-P-656a), 1 hr between coats
Army and Navy Aeronautical AN-TT-E-501	—	Spray, brush	Types I and III 18 hr air dry; types II and IV 30 min at 295 to 305°F	Boiling water 10 min	4 hr	32°F, bend at 180°, rapidly	Heat resistance type I, 24 hr at 491° to 590°F	Enamel glyceryl phthalate (black)	Aircraft engine cylinder and instruments	Steel and aluminum, etc.	Types I, II, III, IV, heat resisting enamel
AN-TT-L-51	2:1	Spray, brush	Air dries 30 min	24 hr	—	⅛ in. mandrel	—	Cellulose nitrate lacquer pigmented	Exterior aircraft	Anodized aluminum	Two coats over zinc chromate AN-TT-P-653a
AN-TT-P-565a	Spray 1:2½ Dip 1:1 Brush 1:1½ Thinner-AN-T-86	Spray, brush, dip (withdraw 1 in. per min)	Air dries 10 min	—	—	⅛ in. mandrel	—	Zinc chromate	Primer coat	Anodized aluminum, magnesium, steel	One or two coats as primer, air dried on cadmium plate, bake ½ hr at 250°F
Army Ordnance 3-162b Specular gloss-meter 2-6	1:1 by vol; thinner No. 1139	Spray, dip	Air dries 10 min	—	—	⅛ in. mandrel	150 hr	Lusterless lacquer enamel pigmented	Exterior coats, shells, grenades, bombs, ammunition, components	Steel	Grades I and II, non-infra-red and infra-red (olive drab only), reflective
Federal TT-L-58	As required; thinner TT-T-266	Spray	Touch 10 min for polishing to high gloss in 24 hr	18 hr	15 min	Bending double over ⅛ in. mandrel	⅛-in. mandrel at 77°F	Lacquers clear and pigmented	Inside and outside final finish	Over primed metal and sealed wood	Federal standard stock catalogue (hiding power 17 sq ft) white, yellow, organic, red, other colors; 225 sq ft per gal for synthetic types
U. S. Q. M. C. E. S.-680a	As required; ES-680a class 637-85:15	Spray, brush, dip	¾ hr at 250°F; also air drying and combination types	16 hr, 15 min at boil	16 hr, 15 min in boiling water	⅛ in. mandrel	16 hr at 120° to 400°F, wrinkle enamels 2 hr immersion	Synthetic type protective finishes	Motor vehicles, pontoons, tanks, signal equipment, etc.	All metals	Six series of materials, class A to F, series 100 to 600

Metals, Finishes, And Finishing Processes

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IN this final section of a four-part article the author gives data on infra-red drying time, tinting and hiding power of white pigments, luminescent coatings, testing equipment and procedure for metal finishes. In the three previous sections of the article, attention was directed to spot tests for identification, porosity tests for electrodeposits, comparison of pickling-degreasing cleaning procedures, electrolytic and acid pickling, removal of oils, various cleaning operations, electropolishing, selection of surface finishes for functional and decorative purposes, proprietary plating baths, surface treatment of aluminum and magnesium alloys, etching procedures, dye coloring, etc.

A glance at table XXIX may leave the impression that radiant heating is more effective than convection heating. However, there are limitations to radiant-heat drying. These limitations do not detract from its undeniable efficiency for certain applications and materials. The limitations of radiant heat drying and baking are as follows:

(1) Materials requiring baking at temperatures much in excess of 300°F may be more effectively treated in convection ovens, e.g., oleoresins, some wrinkle finishes, Japans and enamels with soya oils.

(2) House paint and other materials which cure by oxidation are not effectively "cured" by radiant heat.

(3) Paints which dry by evaporation are more effectively dried by convection heat.

(4) Polished surfaces require about 20 pct increased radiant energy; while no increase is required in convection ovens.

(5) An increase of 9 to 45 pct is required in radiant energy when drying certain colors of lacquers. The

TABLE XXIX

COMPARISONS OF CONVECTION AND RADIANT (INFRA-RED) DRYING TIME ON A FEW SPECIFIC SYNTHETIC LACQUERS

Army and Navy	Type of Coating	Main Component	Convection Drying Time, Min; Temperature, °F	Radiant Drying Time, Min
PX-783	Zinc chromate primer	Glycerol phthalate	1½ min; 160° F	½
Army Air Corps 14080	Zinc chromate primer	Glycerol phthalate	10 min; 160° F	½
Navy Air Corps AN-TT-656a	Zinc chromate primer	Glycerol phthalate	1½ min; 160° F	1½ to ⅓
Q-MC-ES-3596	Rustless inhibited primers	Glycerol phthalate	30 min; 200° F	4½
HQD-ES-680	Rustless inhibited primers	Glycerol phthalate	60 min; 160° F	4½
Army-3-162A	Lacquers for ammunition	Nitrocellulose	15 min; 160° F	2½ to ⅓
Army-3-106E	Acid proof black	Bituminous base	30 min; 160° F	4½
14165	Camouflage lacquer	Nitrocellulose	10 min; 160° F	8
Navy E-5e	Aircraft enamel	Glycerol phthalate	15 min; 300° F	8
Q-MC-ES 4746	Lusterless olive drab	Glycerol phthalate	60 min; 250° F	4½ to 8
HQP-ES-680	Lusterless olive drab	Glycerol phthalate	60 min; 250° F	4½ to 8
ES-5106	Stencil enamel	Glycerol phthalate	30 min; 200° F	3
T-1103	Olive drab primer	Glycerol phthalate	60 min; 300° F	5½

TABLE XXX

COMPARATIVE DRYING TIME OF COLORED LACQUERS BY INFRA-RED LAMPS

Drying Time, Min	COLORS: On 22 Gage Steel, With Lamps at 12-in. Distances From Work, 11-in. Centers at 2 w Per Sq In.				
	Black	Gray	Green	Blue	White
5	325° F	310° F	295° F	285° F	275° F
10	350° F	325° F	315° F	310° F	300° F
15	360° F	340° F	330° F	325° F	310° F
5	Drying Temperature on 20-gage, Black Lacquer, at Stated Wattage Per Sq In.				
1.2 W Per Sq In.	210° F	.....	.....	.....	.....
2.0 W Per Sq In.	275° F	.....	.....	.....	.....
6.0 W Per Sq In.	500° F	.....	.....	.....	.....

use of radiant baking may make it necessary to have a variety of color formulations as compared to convection-heat drying requirements.

(6) Flat surfaces present the best condition for radiant-energy baking, as an increase in the distance of the radiant source to the work from 6 in. centers to 10 in. centers will increase the temperature or time requirements 150 to 500 pct. Little efficiency is lost by the same relative increase in distance of heat source to work in convection ovens.

(7) The relative loss of time in baking metal with heavy cross-sections, in convection ovens and radiant-energy ovens presents a favorable aspect for the convection method when baking castings and similar shapes.

Surface Designation of The American Standards Association

SURFACE DEVIATIONS: Surface flaws, waviness, roughness, etc.

SURFACE FLAWS: Scratches, ridges, holes, peaks, cracks, checks, etc.

WAVINESS: Recurrent or random irregularities.

ROUGHNESS: Irregularities superimposed on wavy surfaces; or on smooth machined surfaces the width of such irregularities are 0.000,0001 in. to 0.0005 in.

MEASUREMENTS OF SURFACE DEVIATIONS: (1) Surface flaws may be viewed with the naked eye; (2) waviness may be measured with a dial gage; and (3) roughness is gaged with the Physical Research Co. Profilometer, or a device such as the Surface Analyzer of the Brush Development Co., or with much less accuracy by a thumb and finger nail comparison with standards (standards are generally plastics).

ROUGHNESS MEASUREMENTS: The square root of the sum of the squares of the distance from the peaks of the curves to the axis of the curves in microinches (millionths of an inch). These values are referred to as rms (root square mean).

CLASSIFICATION OF ROUGHNESS MEASUREMENTS: The analyzer type of machine referred to gives the measurement direct in the actual profile of the surface at great amplification. Illustrative values: Fine finishing operations have a shiny appearance; good grinding, honing, etc., would have rms values of 32 to 8 microinches. Extremely fine finishing operations like lapping done with great care will average around 4 to 1 microinches. Highly polished pieces may attain 0.25 to 0.50 microinch rms values. A mirror finish does not necessarily imply a good surface nor does a dull finish designate a poor surface, as surface and finish may not be synonymous. For instance, by burnishing a very rough surface with a dull grinding wheel the high ridges can be bent down, partly filling the deep valleys, which will present a mirror finish on an imperfect surface, of short life, as the ridges will flake off and expose the imperfect surface. A contrary condition may be obtained on a practically perfect surface by giving it a matte finish.

TABLE XXXI

TINTING AND HIDING POWER OF WHITE PIGMENTS

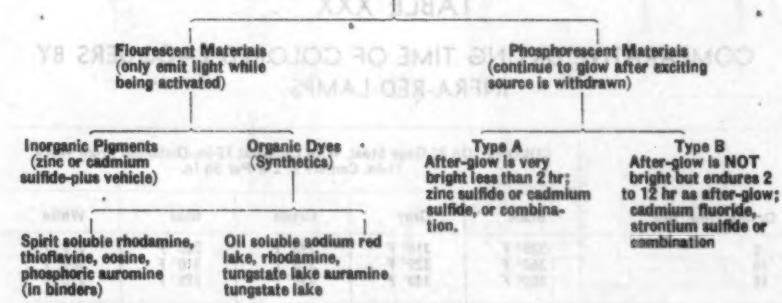
Pigment	Tinting Strength	Hiding Power, Sq Ft Per Lb	Hiding Unit
Basic lead carbonate	100	15	1.00
Basic lead sulphate	85	13	0.87
Zinc oxide	200	20	1.33
Zinc oxide and 15 pct leaded	170	20	1.33
Lithopone	260	27	1.80
Titanium and barium pigment A	380	40	2.67
Titanium and barium pigment B	430	46	3.07
High-strength lithopone	400	44	2.93
Titanated strength lithopone	400	44	2.93
Titanium-calcium pigment	450	48	3.20
Titanium magnesium pigment	440	47	3.13
Zinc sulfide	540	58	3.87
Lead stannate	570	60	4.00
Titanium oxide	1150 (best)	115 (best)	7.67 (best)

It will be noted that titanium oxide has nearly double the tinting strength and hiding power as compared to the next nearest in quality.

TABLE XXXII

LUMINESCENT COATINGS
(Of Non-Radioactive Materials)

Luminescent materials have the property of converting radiant energy of short wave length, popularly called black light, to visible light.


Flourescent Materials (only emit light while being activated)
Phosphorescent Materials (continue to glow after exciting source is withdrawn)
Inorganic Pigments (zinc or cadmium sulfide-plus vehicle)
Organic Dyes (Synthetics)
Type A After-glow is very bright less than 2 hr; zinc sulfide or cadmium sulfide, or combination.
Type B After-glow is NOT bright but endures 2 to 12 hr as after-glow; cadmium fluoride, strontium sulfide or combination
Spirit soluble rhodamine, thioflavine, eosine, phosphoric auromine (in binders)
Oil soluble sodium red lake, rhodamine, tungstate lake auramine tungstate lake

BINDERS: Air-drying types; alkyd resin oil type, cellulose nitrate or acetate, chlorinated rubber, damar resin, vinyl resin, methacrylates, etc. Baking types of binders; alkyd, melamine alkyd, urea alkyd resins.

COLORS: Green through yellow, orange, deep red; visible light colors do not correspond to the fluorescent colors.

MANUFACTURERS

Alox Corp., Niagara Falls.

American Lubricants, Inc., Buffalo.

F. E. Anderson Oil Co., Portland, Conn.

Ball Chemical Co., Pittsburgh.

Carbozite Corp., Middletown, Conn.

Colonial Alloys Co., Philadelphia.

Dulite Chemical Corp., Middletown, Conn.

Freedom Oil Co., Freedom, Pa.

Gladden Co., Cleveland.

Gulf Oil Co., Pittsburgh.

E. F. Houghton Co., Philadelphia.

S. C. Johnson & Son, Inc., Racine, Wis.

Lehigh Chemical Products Co., Allentown, Pa.

Nox Rust Corp., Chicago.

Penola, Inc., Pittsburgh.

Quaker Chemical Co., Conshohocken, Pa.

TABLE XXXIII

PRESERVATIVES (RUST PREVENTIVES)

Spec. Nos., Army-Navy, Federal	American Iron and Steel Institute No.	Description of Film	Use (Instances)	Application	Physical Properties Test Requirements
2-82 C AN-C-52 type 2, grade B	AEX	Hard, dark, thick; removed by kerosine, etc.	On high finishes, exposure to high temperature and abrasion, exposure up to 10 years	Dip or brush, 150° to 165° F	M.P. 159° F min, penetration 60 to 90 min, 30 days weather protection
2-84 b AN-C-52 type 2, grade A	BEX	Soft, dark grease, removed by kerosine, etc.	As above, but for temporary outdoors, or 1-year indoor exposure	Dip, 135° to 165° F; brush 60° F	M.P. 133° F approximate, penetration 200 to 275 min; drying time 120 hr at room temperature, withstands min of 300 hr of 100 pct humidity at 100° F
U.S.A. 2-120 AXS-777	—	Light color, low pour	Small assemblies	Dip, spray, brush	Flash point 275° F min; withstands min of 200 hr of 100 pct humidity at 100° F
U.S.A. 3-182	—	Synthetic resin varnish film 0.001 in. thick and transparent	Electrical circuits, engine parts	Dip, spray, brush	Can be handled in 8 hr, withstands min of 100 hr in 4 pct salt spray
AXS-673 AN-C-52 type 1-52 C-18—Grade 1	CEX	Dark solvent solution film 0.002 to 0.0025 in. thick, removed with kerosine, etc.	Parts not bright finished	Dip, spray, brush	F. P. 100° F min, 60 pct max solvent contents. Max drying time 24 hr; 20 pct salt spray resistance at 100° F, 300 hr min; stands min of 20 hr synthetic sea water dip
AXS-674, rev. 2	—	Inhibited lubrication oil	Highly finished operating parts, other than internal combustion engines	Dip, spray, brush	F. P. 100° F min; 60 pct max solvent contents. Max drying time 24 hr; 20 pct salt spray resistance at 100° F, 300 hr min; stands min of 20 hr synthetic sea water dip
AXS-702, rev. 1 O.S.-1362	EEX	Light non-hardening oil	Temporary lubrication and protection	Dip, spray, brush	F. P. min 100° F; withstands 100 pct humidity at 100° F; min of 200 hr
AXS-934, rev. 1	—	Inhibited engine oil SAE 10 or SAE 30	Air compressors and engines other than aircraft	Dip, spray, brush	Withstands min of 20 hr in synthetic sea water; withstands min of 200 hr 100 pct humidity at 100° F
U.S.A. 2-121 AXS-1001	—	Car, medium-hard grease	Highly finished parts, long-term indoor, short-term outdoor	Dip, spray 200° to 210° F	M.P. 140° F min, penetration 120 to 160; dries 14 days min; withstand min 20 days 20 pct salt spray
AXS-1015, rev. 1 AN-C-125 Navy 52-C-31	—	High melting point wax	Sealing packages	Dip 180° to 200° F	Softens min 145° F; penetration max 60; water absorption 20 pct wt increase; 1 week setting time; 1/64-in. 2 min max
AXS-1167 An-C-117	—	Plastic material film removed by peeling	Small parts for shipment	Dip 360° to 370° F	Withstands 100 pct humidity at 100° F min of 725 hr; tensile strength 450 psi, min elongation 50 pct
AXS-1347	—	Dark, soft non-drying-solvent removed	Anti-friction bearings	Dip, brush, spray, 140° to 160° F	Min drying time 14 days; withstands 100 pct humidity at 100° F min of 300 hr
AN-C-52A type 1	—	Dark solvent solution 0.001 in. film, removed in 24 hr by kerosine	Severe open-work exposures	Dip, brush, spray, 40° to 95° F	Withstands weather min of 1 year, F. P. 100° F min
AN-C-52A type 2	—	Dark solvent solution 0.001 in. film, removed in 24 hr by kerosine	Severe open-work exposures	Dip, brush, spray, 40° to 95°, 170° to 220° F	F. P. 350° F min; M. P. 180° F min; penetration point 30 to 90; withstands 135° F for 4 hr; salt spray at 95° F min 4 weeks; weather for 1 year
AN-C-124 type 1	—	Dark solvent solution film 0.002 in.	Indoor storage	Dip, brush, spray, room temperature	F. P. min 100° F; withstands two weeks salt spray
AN-C-124 type 2	—	Medium dark grease	Indoor storage of anti-friction bearings	Dip, brush, 165° to 190° F	M. P. 110 to 150° F; salt spray resistance 20 pct for 2 weeks
TM-38-305 M-406	—	0.0003 in. film	Finger print and acid neutralizer	Dip, brush	F. P. 105° F; fire point 110° F; viscosity 39 at 100° F; 70 pct solvent
O.S. 627 Navy Ord.	—	Petrolatum material	Guns under severe exposure	Dip, brush, 170° to 190° F	M. P. 150° F min, 160° F max, containing 0.15 pct sodium chromate; weather resistance 1 year
52C-16 Navy	—	Petrolatum material	Loosening scale and rust prior to wire brushing	Spray or brush	F. P. grade 1 280° F min; grade 2 315° F min; 4 pct salt spray test
52 C 17 type A type B type C	— — — —	Thick film; plastic, red, semi-hard; plastic, brown, semi-hard	Working surfaces, Steel decking, etc. Submarine ballast tanks	Brush dip; brush, 160° to 190° F; brush, 170° to 190°	F. P. 450° F min, oven, salt water, etc. tests. F. P. 450° F min, 0.2 pct chromate content; slick test M. P. 120° F min
52 C 18 grade 1 grade 2	— —	Dark solvent solution 0.002 in. film; amber solvent solution, 0.001 in.	Outdoor; steel and tin plate indoors	Spray, dip, brush, at room temperature to 40° F	F. P. 100° F min; 50-day weatherometer test; 4 weeks min salt spray at 100° F
grade 3	DEX	Amber solvent solution, 0.003 in.	Steam and humid exposure	Spray, dip, brush, at room temperature to 40° F	F. P. 100° F min; 25-day weatherometer test, 2 weeks salt spray F. P. 100° F min; withstands 4 months in shed exposure

Rosco Laboratories, Inc., Blawknox, Pa.

Shell Oil Co., New York.

Socony Vacuum Oil Co., New York.

Standard Oil Co. of Indiana, Chicago.

Standard Oil Co. of Ohio, Cleveland.

Stevenson Bros., Philadelphia.

Thompson Paint Co., Pittsburgh.

Turco Products Inc., Los Angeles.

Union Oil Co. of California, Los Angeles.

Zopher Mills, Inc., Brooklyn.

American Lanolin Corp., Laurence, Mass.

Antica Products Co.

Black Bear Co., New York.

O. B. Bray, Los Angeles.

Cities Service Co., New York.

Dearborn Chemical Co., Chicago.

Delta Oil Products Co., Milwaukee.

Frost Paint & Oil Co., Minneapolis.

Glyco Products Co., Inc., Brooklyn.

Hollingshead Corp., Camden, N. J.

Humble Oil & Refining Co., Houston, Texas.

Kendall Refining Co., Bradford, Pa.

McCambridge & McCambridge Co., Baltimore.

Pennzoil Oil Co., Penn, Pa.

Presstite Engineering Co., St. Louis.

Quaker State Refining Corp., Oil City, Pa.

Scholler Bros., Philadelphia.

Simonize Co., Chicago.

Sonneborn Sons, Inc., New York.

Standard Oil Co. of New Jersey, New York.

Sta-Vis Oil Co., St. Paul.

Texas Co., New York.

Special Chemical Co., New York.

Union Oil Co. of California, Los Angeles.

Viscosity Oil Co., Chicago.

Denis Mfg. Co., S. L. Smythe grease proof wrapping paper for mechanical protection; spec. AXS-1246-type 1.

Industrial Tape Corp., New Brunswick, N. J., Utilitape, waterproof tape for packing glands, etc.

NOTE: Previous to applying rust preventives, surfaces must be wire brushed, scraped, sandpapered or emery papered to remove loose scale. Old grease removed with paddles or solvents. Flanges, piping, chambers, casings, etc. should be closed off with ¼ in. hard felt pressed in with plywood and secured with wire. Felt similar to Booth Felt Co. grade No. 2 is suitable. Fungicide inhibitors may be added to rust-preventive compounds, as well as to certain types of paints and lacquers.

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TABLE XXXIV

METAL SURFACE TESTING EQUIPMENT AND PROCEDURES

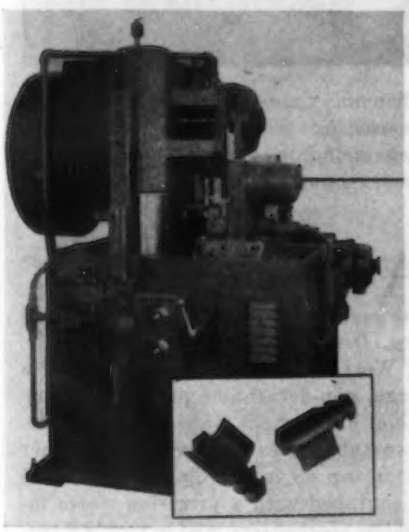
Test For	Device or Process	Source of Supply
Abrasion	Abrasiometer and Nieberding wear testing machine	Taber Instrument Co. and laboratory supply firms
Abrasion	Timing the action of sanding (sand blasting) against a reciprocated specimen	Sand blasting equipment manufacturers
Adhesion and abrasion	Wet abrasion testing (for paint and lacquer) device. Fed. Spec. TT-P-146 and Ord. Dpt. U.S.A.—AXS-736, rev. 11	Henry Gardner Laboratories
Adhesion	Erickson cup tester	Laboratory supply firms
Adhesion	Two specimens (plated metal) are soldered together and a tensile testing machine applied	Manufacturers of tensile testers
Adhesion	Ollard Roehl method for plated surfaces; a plated ring and plunger device	Laboratory supply firms
Ageing	Dry heat cabinet, 140° F for 84 days, remove every 14 days and given an impact test	Laboratory supply firms
Blackness	Nigrometer, glossometer, reflectometer	Laboratory supply firms
Color comparison	Spectrophotometer, reflectometer, glossometer	Laboratory supply firms
Color retention	Violet ray, fadometer, or test in direct sunlight	Laboratory supply firms
Corrosion resistance	Salt spray cabinet or actual exposure, A&N Specification AN-QQ-S-91, also Jungle box	Manufacturers of salt spray equipment
Drying time (paint film)	Sward hardness rocker (hardness and drying time)	Laboratory supply firms
Durability	Kauri reducter test	Laboratory supply firms
Elasticity	Knife peeling test	Home made
Fading	Weatherometer and humidity cabinet	Laboratory supply firms
Flexability	Bend specimen over various size mandrels (Zuhr mandrels), see data on paint and lacquer	Home made
Gloss	Glossometer	Henry Gardner Laboratories, hotovolt Corp., and G. E. Corp.
Hardness	Knoop Indenter (U. S. Bureau of Standards Tukon Test) research paper No. 1220	Laboratory supply firms
Hardness	Microhardness testers for plated surfaces	Ames Gage Co., Eberback & Son Co
Hardness	Superficial hardness tester for thick plated work	Rockwell, etc.
Drying and baking temperatures	Surface heat on baked work, surface pyrometer	Laboratory supply firms
Hiding power paint, etc.	Pfund cyptometer for paint and lacquer	Laboratory supply firms
Hiding power electrolytes	Haring cell for testing electrolytes	Laboratory supply firms
Hiding power	Hull cell or bent cathode tester	Laboratory supply firms
Impact resistance	Use a 16-lb hammer, 2½-in. peen end-tipped to 7/16-in. diam with 24-in. impact fall	Home made
Internal Surface inspection	Polan borescope	Laboratory supply firms
Porosity	See table II on porosity testing	Home made
Surface imperfections	Profilometer and surface analyzer	Physical Research Co., Brush Development Co.
Surface imperfections	Fax film: a removable plastic film for three-dimensional study	R. D. McDill Co.
Surface imperfections	Zyglo process: Degrease and heat part to 180° F and apply a penetrant with fluorescent paint, dry after a mild water flush and wipe delicately with rag. Examine in a dark room under ultraviolet light for visible cracks	Magnaflux Corp.
Surface stress	Stresscoat process (strain gage), numerical values	Magnaflux Corp.
Thickness	Cyclograph, comparative study	DuMont Laboratory Co.
Thickness	0.0001-in. metallographic plates for 0.001-in. micrometer	Laboratory supply firms
Thickness	Magne Gage, or coating thickness tester	American Instrument Co., G. E. Corp.
Thickness	Pfund-Feld paint thickness tester	Laboratory supply firms
Thickness	Ames dial gage	Ames Gage Co.
Paint consistency (viscosity)	Ford cup tester, other viscosity cups, etc.	Laboratory supply firms
Wetting power	Tensiometer Du Nuoy	Laboratory supply firms

New Equipment . . .

Machine Tools

. . . . ***Recent developments in milling machines, drills, lathes, broaches, saws, and grinding equipment are described and illustrated herein.***

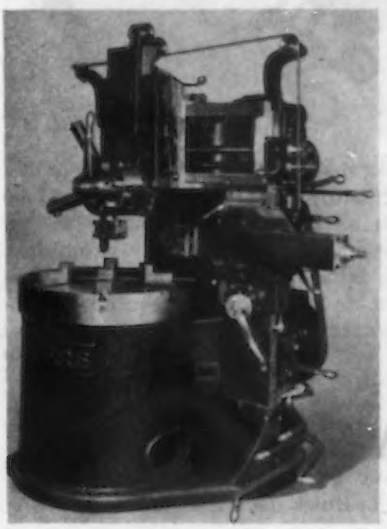
FOR automatically milling and cutting off parts from bar stock at high production rates, a special machine has been introduced by *Kent-Owens Machine Company*, Toledo 10. One operator can tend two or more machines, his only duty being to insert new bar lengths as they are exhausted. This machine is for the manufacturing of hinge parts, pole pieces, turbine blades, molding, hardware and similar parts. The head is



actuated hydraulically with proper adjustments so that any desired cycle or feed rate may be obtained. Suitable fixtures and clamping jaws can be provided to accommodate various cross-section shapes of bar stock.

Vertical Turret Mill

EQUIPPED with an adjustable five-position main vertical turret that provides tool settings for boring, drilling, reaming, turning and thread cutting, a vertical turret mill has been announced by the *Rogers Machine Works, Inc.*, of Buffalo. Quick acting lever permits indexing of turret head. The main stake has an adjustable swing up to 30° each side of vertical in addition to being adjustable left to right and up and down. Swivel side head permits setting at any angle up to 35° each side of horizontal, and is also adjustable up and



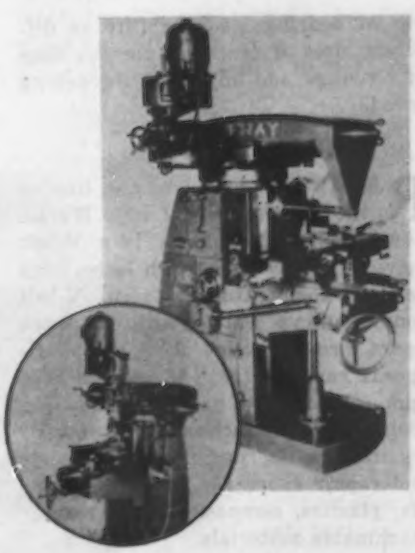
down and left and right. Foot controls are accessible to the operator for clutch and brake control and changeover of main drive speeds.

Crush Dressing Device

A POWERED crush dressing device for use with the Model "B" thompson surface grinder has been announced by the *Sheffield Corporation* of Dayton. A 1/3-hp gear head motor is directly coupled to a grinding wheel spindle at the rear of the housing and this drives the wheel at crushing speed through an overrunning clutch, which is thrown out of engagement when actually grinding. In applying crush dressing, the method is to have the grinding wheel revolve the crusher roll. A feature of the sheffield device is feeding the crusher into the wheel by means of an electric motor, which turns the micrometer in-feed screw at a constant rate. There are two styles, model "B" is semi-automatic with the feed dial indicator preset for a desired depth of automatic infeed of the crusher roll. With model "A" the operator controls the device by pressing a push button and releasing the pressure when the feed indicator dial shows that the desired depth has been reached. Advantages of the power crushing device include reduction of dressing time, increased crusher roll life, longer wheel life and more parts per dressing. Model "B" has the advantage of keeping the amount of stock removed from the wheel to a minimum.

Milling Machine

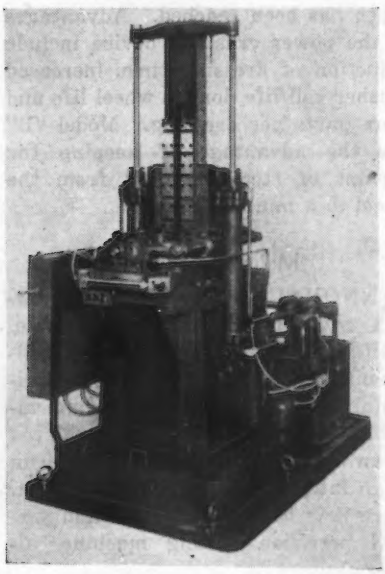
ANNOUNCED by the *Fray Machine Tool Company*, Glendale, Calif., is a turret head, ram type milling machine, built for vertical or horizontal work operations, featuring variable speed to power feed, achieved by an electronic control panel built-in as an integral part of the equipment. Since it is both a horizontal and vertical precision milling machine, al-



most any operation at any angle or compound angle can be completed without changing the original work setup. The fray no. 9 is said to meet requirements for best use of installation space in factory or shop layout, and simplifies maintenance. Work operations include precision jig boring, slotting, drilling, tapping, keyway milling, end milling, profile milling, die sinking, mold routing, serrating, spotfacing, counterboring, punch forming and spline milling.

Broaching Machine

A SPECIAL purpose machine for broaching the ID and split-line surface of automatic type precision half-bearings, has been announced by *Hydraulic Machinery, Inc.*, 12825 Ford Road, Dearborn. The cycle of these vertical type machines, is entirely automatic except for loading and unloading. Advantages of this special purpose machine are high production, positive alignment and clamp-



ing of bearings, adaptability to different sizes of nests for various sizes of bearings and adjustable broaching speed.

V-Belt Drive Lathe

RECENTLY added to the line of the *South Bend Lathe Works*, South Bend 22, Indiana, is a V-belt drive 9-in. precision bench lathe. This bench lathe features 4-step, V-belt coney pulleys which, with the back gears, provide either 8 or 16 spindle speeds ranging from 46 rpm to 1176 rpm. It can be used for precision toolroom or production work, and for general use in machine, laboratory, and repair shops for machining metals, plastics, compositions, and other machinable materials.

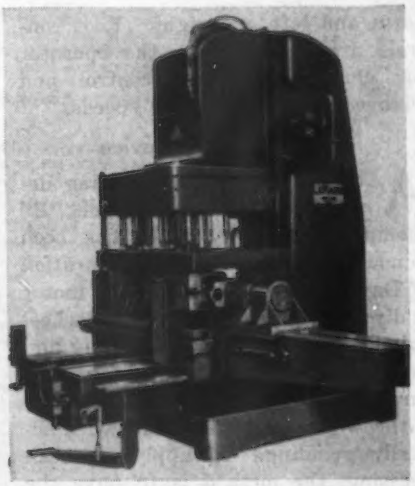
Brake Drum Lathe

A PORTABLE brake drum lathe, with increased adaptability for field service work, or in locations where time and labor can be conserved by bringing the lathe directly to the job, has been announced by the *Barrett Equipment Co.*, St. Louis. The portable equipment is useful where fixed base, or machine shop service facilities are not available, such

as in road construction, isolated building projects, or logging camps, as well as in industrial plants, bus or fleet garages, and similar situations. The lathe has a range of swing from 7 in. to 24 in., and is equipped with rheostat speed control.

Vertical Drill

A MACHINE for drilling 24 holes in two working stations, in a heavy gun part has been announced by *LeMaire Tool and Manufacturing*



Co., Dearborn. This standard vertical drilling and boring machine has been equipped with a 25-spindle drill head and a special 3-position, hydraulically actuated shuttle - index table. The bushing plate on the drill head is equipped with a coolant valve and partition to allow coolant to be directed either to the front or to the rear working position when machine is in operation.

Contour Grinder

FOR crush form contour grinding on surface grinders, the *Thompson Grinder Co.*, Springfield, Ohio, has announced the Thompson-engineered packaged unit. The machine is designed to crush and true the wheel by the most efficient process available, and produce in the most

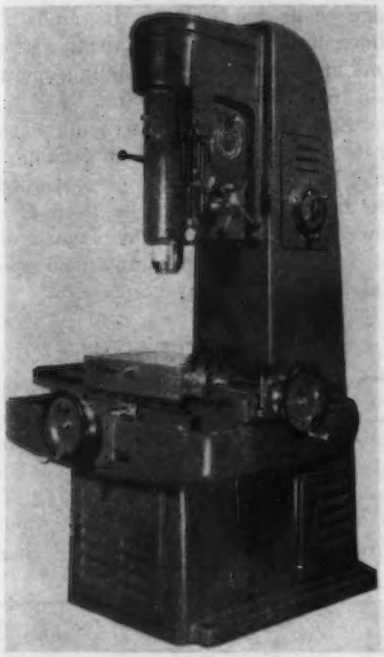
efficient time. The machine can be used in two ways, and will do surface grinding as well as the crush form contour grinding.

Jig Borer

A FEATURE which has been added to the P&W jig borer, has been announced by *Pratt & Whitney, Division Niles-Bement-Pond Co.* of West Hartford. This consists of a large, non-detachable precision rotary table built right into the machine. Two table sizes are available: either 42 in. or 48 in. in diam. The table is equipped with a precision worm indexing mechanism, and a spacing system may be provided in the outer rim. Either table will handle holes bored on a diam. of 53½ in. The largest outside work diam. that will clear the column ways is 71 in. If the work will fit into the gap below the column ways the maximum outside work diam. can be increased to 89 in. The standard distance from the table top to the spindle nose is 24⅛ in. Both this and the gap distance can be increased as desired by using raising blocks under the machine column. The machine will also function for certain precision milling jobs within the limitations for which the jig borer can be expected to be used for this type of work.

Boring Machine

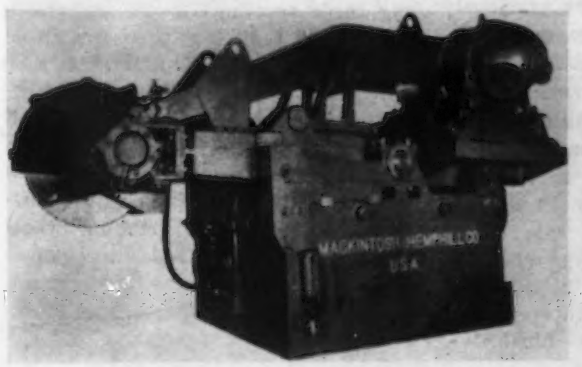
DEVELOPED to handle a wide variety of precision boring from the finest tool room work to precision production jobs, a model C Milwaukee automatic boring machine has been



announced by the *Kearney & Trecker Products Corp.*, of Milwaukee. In designing and manufacturing this machine, particular stress has been placed on accuracy, rigidity, compactness, range and simplified operation.

Tilting Hot Saw

SIMPLICITY in principle and operation, and compactness that makes it adaptable for installation where space is limited, are two of the features of the 50-in. tilting hot saw, announced by the *Mackintosh-Hemphill Co.*, Pittsburgh. This saw, which is powered by a 150-hp motor, is adapted for cutting billets, rails and similar types of sections. One of the construction departures is the incorporation of a new mandrel with Timken bearings having a force feed circulating oil system.



Plunge Cut Grinder

A MULTIPLE precision grinding machine for plunge-cut grinding three spottings on 96-in. torsion springs for tanks has been announced by *Fitchburg Grinding Machine Corp.*, Fitchburg, Mass. Independent Fitchburg bowgage heads can be built to cut costs through multiple automatic precision grinding on mass production. It grinds all dimensions at the same time, within time of longest single grinding operation, and in one handling. All Fitchburg bowgage head precision grinding wheel units are standard and interchangeable. If any operation is discontinued, the heads can always be used elsewhere, either on standard machines or regrouped and remounted on new special bases.

Hydraulic Feed Machine

A HORIZONTAL, hydraulic feed machine with automatic indexing fixture for drilling and reaming twenty-four 5/16-in. holes and finish boring twenty-four 1¼-in. holes in an aluminum ring, has been announced by the *Moline Tool Company*, Moline, Ill. Its operation is entirely automatic, with rapid traverse and feed of the spindle units as well as the fixture indexing mechanism being actuated by electrically controlled hydraulic power. Complete safety interlock of the electrical, mechanical and hydraulic function has been provided.

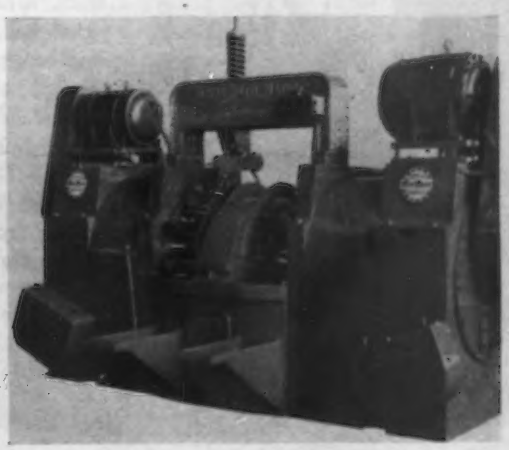
Carbide Tool Grinder

A CARBIDE tool grinder has been announced by *E. F. Hager and Son*, 98-02 217th Lane, Queens Village 9, L. I., N. Y. This grinder speeds up the important function of precision carbide tool grinding and eliminates the need of highly skilled operators. It also grinds, or laps, to a high degree of precision, carbide cutting tools for lathes and screw machines, as well as tool bits with carbide tips inserted in milling cutters. All angles can be accurately rough and finish ground, or lapped, on the diamond wheels by simple mechanical settings in less time than rough grinding

alone requires on hand tool grinders. It is claimed to eliminate guess work and free-hand operation. Parallel sides are easily obtained and duplicate tools can be ground and used interchangeably.

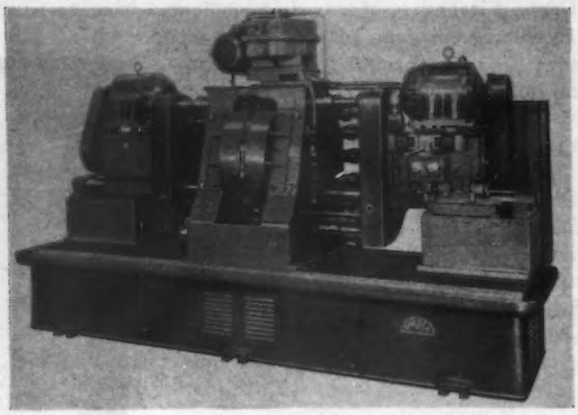
Continuous Drill

TO fill a need for a high production machine capable of drilling identical or similar parts, parts that require drilling from both sides or parts that require a drilled hole from 7 in. to 12 in. deep, a roto-matic 24 spindle horizontal continuous drilling machine has been announced by the *Davis and Thompson Co.*, 6411 W. Burham St., Milwaukee 14. Two 20-hp motors constitute the driving force for the drill spindle housings while the motor on the left hand side also rotates the mandrel fixtures and spindle housings. A feature of this machine is that the entire fixture and work piece are submerged in a coolant tank while the drilling is being performed. A manual clutch lever is provided for stopping the feed while the motors are controlled by push buttons.



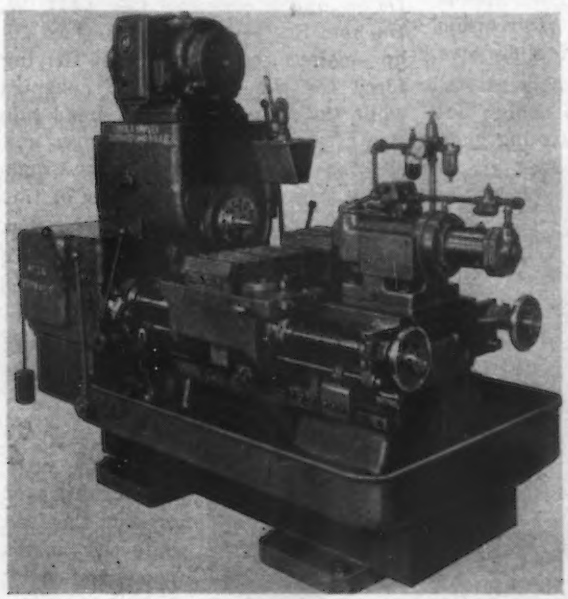
Hollow Milling Machine

A DOUBLE-END machine for hollow milling one or two trunnions on converter blades of various shapes and sizes, has been announced by *Snyder Tool and Engineering Co.*, 3400 E. Lafayette, Detroit 7. In this machine, two self-contained hydraulic units and multiple heads and an electrically driven fixture trunnion with holding jaws, are assembled on a welded steel base. Tool spindles are guided in the trunnion side members and are equipped with precision and stop adjustment to maintain accuracy and depth of cut. The trunnion is indexed station to station by a Geneva index mechanism mounted on top of the trunnion assembly. Work parts of various shapes and sizes are accommodated by exchanging the holding jaws on the fixture and adjusting the side locating plates. Production is 575 units an hr.



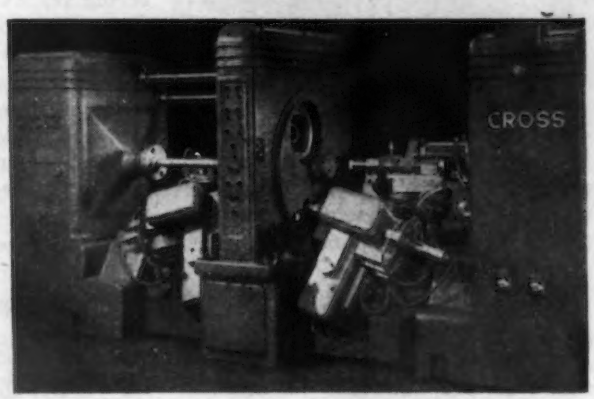
Automatic Lathe

AN automatic lathe, the 2A Duomatic, for improved production of small jobs, has been announced by the *Lodge and Shipley Machine Tool Co.*, 3082 Colerain Ave., Cincinnati 25. This lathe provides full automatic handling of small work. It is also designed for a field of work in which a small size automatic lathe is needed, and it retains all the features of the bigger, more powerful 3A. It is said to make available more effective use of multiple tools in turning, and straight and angular facing operations. It is designed for quantity production of lathe work arranged between centers, on an arbor, or in suitable chucks or fixtures, and is also adaptable to handling of small runs. This lathe is for all practical purposes like two lathes in one.



Grinding and Honing Machine

A FOUR spindle machine which simultaneously grinds and hones two hardened taper bearings, cast integral in automotive wheel hubs has been announced by *Cross Co.*, Detroit. All elements of the machine are hydraulically actuated and automatically controlled by electric push buttons. In the automatic cycle, the trunnion indexes to bring the work into position at each station. While the grinding heads rough-grind, retract, dress and finish-grind both taper bearings in opposite ends of the hub, the previously ground bearings in another hub are being honed. Grinding coolant is automatically flushed from the hub as it indexes to the honing station. Production is at the rate of 50 wheel hubs an hour machined to an accuracy of three microinch surface finish.



Grinding Machine

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Rotary Cut-Off Machine

COMPLETELY automatic in its operation, a rotary cut-off machine for ¾-in. to 5-in. OD tubing or 4-in. pipe, has been announced by the *Pines Engineering Co.*, Aurora, Ill. It is equipped with a hollow spindle through which the tubing, is fed into a self-centering hydraulically actuated automatic chuck. The machine will cut 5-in. OD mild steel tubing with ¼-in. wall at the rate of 200 pieces per hr. or 2-in OD tubing with ⅛-in. wall at the rate of 400 pieces per hr.

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Oilgear Fluid Power extends range of amazing wire coating machines

The John Royle & Sons tubers are amazing machines that are coating millions of feet of wire with rubber or plastic insulation each week to meet the exacting requirements of the Signal Corps. Previously, not one of these tubers could produce its full capacity; the mechanical transmissions with which they were equipped originally just were not broad enough in their speed range to permit *one* standard tuber to coat *many* different sizes of wire uniformly with the required thickness of rubber or plastic.

But Oilgear Fluid Power could meet that need . . . and did. The Oilgear Transmission gives a broad range of controlled speeds to the capstan and rewind drive of this machine, enabling the latter to handle more sizes of wire and to do a much better job of coating the wire it handles. Similar benefits can be yours . . . if you will investigate the amazing possibilities of Oilgear Fluid Power for your straight line feeds or rotary drives. No matter what your power transmission problem is, you should know what Oilgear can do. THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee 4, Wisconsin.

Oilgear Fluid Power enables this John Royle & Sons tubing machine to process many sizes of wire with required thicknesses of coating.

ARE YOU TRYING TO:

1. Apply large forces through long . . . or short . . . strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction . . . with or without preset time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
4. Obtain extremely accurate control of either position or speed of a reciprocating member?
5. Apply accurately variable pressure either static or in motion?
6. Closely synchronize various motions, operations or functions?
7. Apply light . . . or heavy . . . forces at extremely high velocities through either long or short distances of travel?
8. Obtain continuous automatic reversing drives at constant R.P.M. or over a wide range of speed variation?
9. Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration?
10. Obtain constant horsepower output through all or part of a speed range?
11. Obtain automatic torque control?
12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full preset automatic control, elimination of problems of shock, vibration, etc.?

You Need Oilgear!

OILGEAR Fluid Power

Assembly Line . . . STANLEY H. BRAMS

• Double production capacity scheduled for Studebaker Corp. . . . Will begin output of its Champion car series next month . . . Cadillac displays new 1946 car.

SOUTH BEND, IND.—Studebaker Corp. has some large ideas about the future, and is acting in agile, sure-footed fashion to translate them into fact.

Newly announced is a $16,000,000 program whose objective is to more than double production capacity of the past, and do it on the most economical possible basis. It is quite evident that the Indiana sector of the automobile industry is not fooling.

Machining departments are being quite modernized, widening the pre-war production bottleneck at South Bend. These departments hitherto had to operate on two and three shifts daily to keep the final assembly line moving on one shift. As a result, production of passenger cars was pretty well limited to about 120,000 units a yr—420 per hr, or 2400 per week. The speeding up of machining operations will make it possible to run the final assembly lines for two capacity turns, providing 240,000 vehicles yearly. And, if demand justifies, work may be done on a third shift as well, putting total output up above 300,000 jobs, although this would require some additional equipment.

Simultaneously, facilities are being enlarged for additional truck volume. Before the war output in this department ran around 3000 units as a rule, but planning now is for volume in the neighborhood of 40,000 or 50,000 units annually, considerable of which is intended for export.

During the war Studebaker, in conjunction with Wright Aeronautical Corp., was a leader in development of in-line progressive machines which combined a great number of operations into one automatic cycle. Greenlees of this sort (THE IRON AGE, Aug. 12, 1943, p. 66) are models for peacetime applications which are presently being installed at Studebaker. On a smaller scale, one machine mills cylinder blocks in progressive operations—a 27 ft long unit which loads and clamps the cylinder blocks, rough and finish mills the valve side and bearing locks, then ejects the block at the end of the machine. Another multiple operation unit is an installation on the crankshaft line where three of the four main Champion engine bearings, the oil seal diameter and the gear fit will be ground simultaneously, substituting for five previously separate operations. Other automatics are also notable additions at the plant.

Precision boring of cylinder barrels with carbide tools is proposed with equipment that will not only provide truer surfaces but will reduce honing. Similar in increased efficiency will be a gear hobbing machine which operates on four camshafts at the same time, and several automatic cam grinders in which camshafts are automatically indexed and precisely ground.

Flywheels will be plunge-cut by a new method that found favor in aviation engine production. New spindles for all grinders of a type first used in aircraft are also announced. The new spindles promise greater accuracy, less chatter and lower upkeep expense.

Falling into the same category of more consistent production are 29 new spot welding machines that carry attachments for precise adjustment of the depth of body and frame welds.

ANOTHER development that arises from experience with the precision grinding of aircraft engine parts is a three-headed, rotary type machine that grinds both the top and bottom of the clutch housing. Formerly one side of the housing was ground while the opposite side was milled. It was thus necessary to repeat the operation after the part had been turned.

The plant layout has been considerably juggled. Cast iron machining now takes place nearer the foundry. A conveyor picks up frames from the

o o o

DESERTED VILLAGE? *Largest war plant in the Buffalo area, this Curtiss Wright plane plant is being deserted in favor of a plant at Columbus. The company's backlog of peacetime business is reported to consist of twenty transport craft.*

o o o

Now — for the first time under one cover — is a condensed but comprehensive picture of Pratt & Whitney's hundreds of machine tools, small tools, and gages.

Obviously, this catalogue cannot contain complete information on any one machine or tool . . . but there are sufficient data to give a very clear picture of each type.

At a glance, the reader can see the broad service Pratt & Whitney is equipped to render industry and how wide is the variety in each classification. We suggest that you keep this catalogue handy as a quick reference. Then when you wish full information on any particular product, simply request it of Pratt & Whitney.

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unloading dock and delivers them to the second floor of the assembly building. A 1000 ft flush-floor type conveyor permits the selection and removal of any car on the final assembly line, eliminating floor protuberances which would handicap work around cars. This conveyor reflects an effort to increase frame stocks and guard against possible shortages, particularly during the irregular transportation services of winter months.

The Studebaker foundry, above mentioned, is being reopened for the first time since the war got underway. New equipment has been purchased for this department, bringing it up to date in good fashion.

The speed with which this postwar program has progressed is due in part to the Studebaker-developed preterminination contact settlement plan, which has made it possible to pretty well clear out its plants very soon after its contracts for prime mover army trucks and Weasel cargo carriers were completed. At the same time, it should be noted that Studebaker had a break in that its Champion engine was maintained in produstion through the war to equip the Weasel.

Output on the Champion car series will begin next month, and volume should be at nearly substantial levels by the end of the year, barring unforeseen circumstances. However, this will not be spread all through the Studebaker manufacturing program. As example, the new truck cab manufacturing and freight receiving building will not be completed before the end of the year, reducing the potential for commercial vehicles until then.

Any survey of this company should be accompanied by the note that it recently granted its employees a 12c an hr wage increase, and so, at least momentarily, appears to have staved off the uncertainty besetting Detroit producers today. Quite obviously, if the substantial pay raises sought by the CIO United Auto Workers Union in Detroit come true, the 12c Studebaker advance—which amounts to somewhat more than ten pct of going pay rates—will rapidly lose face; but certainly in the meantime it seems as though the company will be able to go ahead on a fairly dependable basis.

DETROIT—Cadillac showed its 1946 car to distributors last weekend, an offering carrying a considerable number of war-born improvements. The company is shooting for 100,000 assemblies in its first full year of production, approximately 50 pct more than were manufactured and sold in 1941. Employment, which totaled 4100 before the war and is standing at 4100 today will be boosted to about 7000 by next March, if the drive toward peak at that time is successful.

On the mechanical side the Hydra-Matic transmission has been considerably changed, due to experience in building it for war vehicle use. New thrust bearings are included, internal lubrication is improved, bands are wider and stronger, clutch plates have been redesigned, and many parts have been eliminated. This transmission remains optional equipment.

Moraine Durex main bearings and connecting rod bearings are used in the Cadillac, as apparently in all of the forthcoming 1946 General Motors cars. Valve guides have longer and deeper counterbore to reduce sticking. New three-ring pistons and rings improve structural rigidity and reduce oil consumption, it is claimed.

Appearance wise, the front grille has been widened and made more massive in appearance, and is an integral unit, including parking lamps and auxiliary lights. Front and rear bumpers sweep around the fenders and provide better protection, and the design is intended to achieve lower car silhouette. Body rustproofing has been carried to great length throughout, and chrome plating is increased in thickness to resist corrosion.

Cadillac is revamping its production facilities as part of its program to reach new high output levels. A new building which was begun last spring for war use has now been metamorphosed into the final section of the assembly line, thereby enabling the straightening out of the line in the old buildings. Space formerly occupied by the twisting of this final line will be given over to plating operations, so that parts can flow directly to final assembly from fabrication.

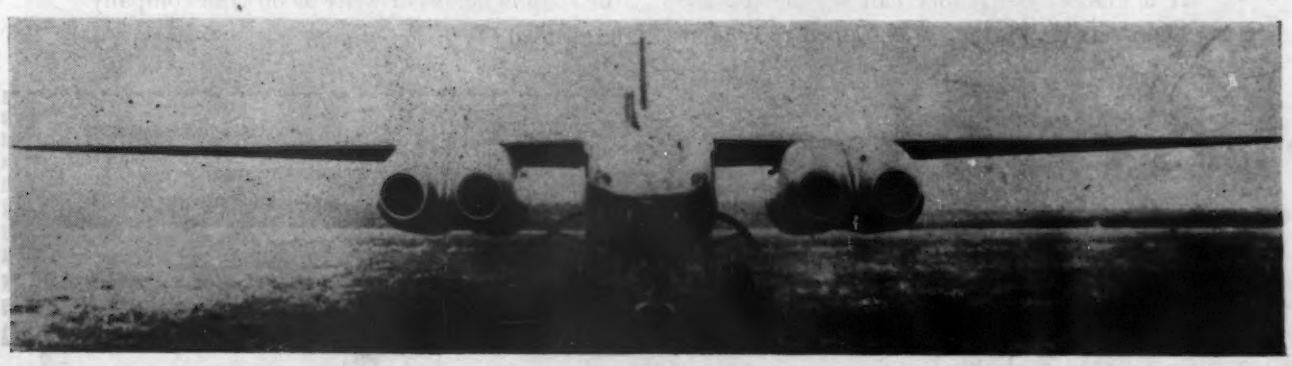
Leases Willow Run Plant

Detroit

• • • **The newly formed** Kaiser-Frazer Corp. has negotiated a 5-yr. lease on the Willow Run Bomber plant, wherein will be produced an entirely new low-cost automobile called the Kaiser and the medium priced car, the Frazer, developed by Graham-Paige Motors Corp. since the accession to the presidency of Joseph W. Frazer, one time president of Willys-Overland Motors, Inc.

The lease of the RFC-owned Willow Run plant is costing Graham-Paige $500,000 for the first year, $850,000 for the second year, and $1,200,000 for each of the next three years. Kaiser-Frazer Corp. will pay all maintenance, insurance, taxes and upkeep. The lease does not contain an option to buy. It includes the main building, power house, service and garage system buildings, commissary building, office building and training system building, and such land as may be needed for the lessee's operations. Not included is the airport, the parts building, and Army Air Force installations on the field.

FOUR JET CRAFT: *Unusual pairing arrangement on the German Ar 234C throws the jet blast from the four units clear of the tail surfaces of the plane. BMW 003 engines power the craft.*



How Your TOOLS & DIES Can Save You EXTRA DOLLARS Every Month

Tooling costs go down when you put this 3-step *job analysis* plan to work. Watch production costs drop as machines and presses stay on the job more hours every month. Use these three steps to stop the loss from tools that wear too rapidly or fail prematurely.

1. Plan Tool Performance BEFORE Tools Are Made

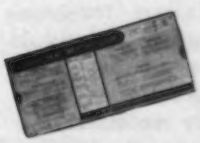
Now you can spot the way to more wear resistance, greater hardening accuracy or greater toughness in a tool. With the Carpenter Matched Set Method you can get tools that reduce costs by staying on the job longer. Put it to work now by using the 167-page Matched Tool Steel Manual. It shows you how to save time, tool steel and money in solving over 90% of your tool room problems. The Manual is free in the U.S.A., so for your copy drop us a note on your company letterhead.

2. Take This Step To Better Heat Treating Results

Proper heat treatment is the second step to better tools that cut costs. To get the heat treating results you want, use the "Matched Tool Steel Manual". It contains the most complete heat treating information available in printed form. And as a special help to your heat treaters, we have prepared a handy slide chart that condenses the basic heat treating information and puts it in easy-to-use form. Drop us a line and let us know how many Carpenter heat treating slide charts you will need.

3. Check Costs By Output Per Grind

In the competitive days ahead, costs will have to be cut. But, costs skyrocket and output slumps when tools fail prematurely in service or need too frequent regrinding. So keep a record of the results from each tool set-up and use it as a guide to get more output, lower costs. And if you want shop help with new tool steel problems, call your nearby Carpenter representative. He can work with you to reduce costs all along the line.

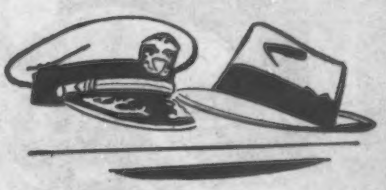


THE CARPENTER STEEL COMPANY
121 W. Bern Street, Reading, Pa.

Carpenter MATCHED TOOL STEELS

Washington . . . L. W. MOFFETT

• Postwar packaging to bring radical changes in types of containers and construction . . . Brookings Institute sees economic structure endangered by wage increases.



WASHINGTON — Pointing out that shipping containers and retail packages for food products now in use are wisely different from those employed at the turn of the century, the Bureau of Agricultural Economics, Dept. of Agriculture, says that even more radical changes in types of containers and packages, and materials for their construction are in prospect for postwar marketing.

In a summary of a forthcoming detailed report on postwar packages and containers by Delbert R. French, former economist of the Bureau, considerable discussion is given to competitive packaging materials and rapid technological advances in recent years. Experience gained during the war in packing for military purposes, it is declared, will be useful in packaging for civilian use. Effects of these changes on packaging, the Bureau stated, are likely to extend beyond the food marketing processes to other aspects of our economic life.

Passing upon competitive materials, the report said that around 2,000,000 tons of steel for cans were used for food canning in 1940 and because of the versatility of this container, the prewar use of tin cans may be exceeded in postwar years. Because of the tin shortage, it was explained, thinner tinplate was used during the war, and fiber canisters and drums as well as glass bottles were substituted for some uses of tinplate. It was added that aluminum alloy cans have been produced on an experimental basis during the tin shortage. The four-way competition among cans and bottles made from tinplate, fiber, aluminum and glass, the Bureau said, is likely to set new standards in cheapness and service for food preservation industries when materials again become abundant.

"Along with new materials for packaging, new techniques for cutting packages costs are probable following the war," the report said. "New packaging machinery to save manual labor, along with techniques to provide for low-cost, large-scale prepackaging of foods are probabilities. Packers would do well to have access to the knowledge provided by continuous research on packaging materials and methods."

Here's what the Bureau sees in the postwar period:

Great expansion in prepackaging of foods formerly sold from bulk. This trend will probably encompass fresh fruits, vegetables and meats. Any increased cost of new packaging will be at least partially offset by savings in labor, waste and transportation. Other compensating returns will accrue to producers and consumers as well as marketing agencies.

SINCE more efficient packaging material will be available, the tendency will be to package a larger proportion of foods at or near the producing area in the case of fresh products, and in the plant of the manufacturer of processed foods. Economies in handling and improvement in quality will result.

New kinds of materials and new types of containers will accompany the use of changed transportation equipment. For instance, lighter and less expensive containers for shipping fresh vegetables dry pack would go along with the installation of dry refrigeration equipment in refrigerator cars. With lighter containers, pay loads that make possible the installation of dry refrigeration in trucks for highway transportation will be feasible.

The invention of transparent films and other materials which permit the prepackaging of fresh products will also call for an extension of refrigeration toward the producing area packing house, if not into the field, and also will call for additional refrigerated cases for displaying fresh products in the store.

Designers of store buildings and equipment will need to take into consideration the increased sale of packaged goods, especially fresh foods, and will need to plan for proper display space for these fresh foods in refrigerated cases.

Packaging will become an increasingly important element in marketing as technological advances in processing and merchandising new products come into common use, and as an increasing proportion of retail trade in foods is handled by self-service stores.

The wartime development of new kinds of packaging materials and methods, in conjunction with other technological advances, will materially affect the competitive position of prewar types of packaged foods, and result in important shifts in the proportions of all foods sold fresh, canned, bottled, and packaged in other containers.

* * *

If expected demands for wage increases in such basic industries as steel, coal mining and transportation are granted, in whole or in part, the whole stabilization program from the cost end will break down, according to a report recently issued by the Brookings Institution.

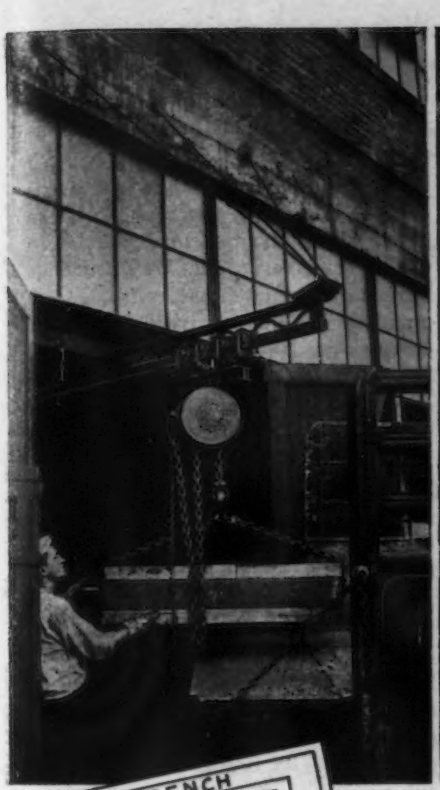
The study, "Should Price Control Be Retained?" was prepared by Brookings President Harold G. Moulton and Karl T. Schlotterbeck, an associate.

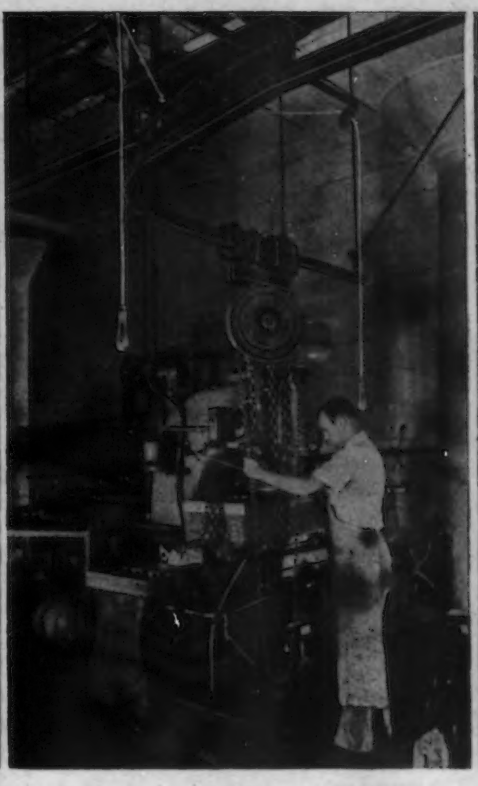
Continuance of price controls into the postwar period would be "impracticable" unless wage stabilization and rationing programs are retained, the report stated.

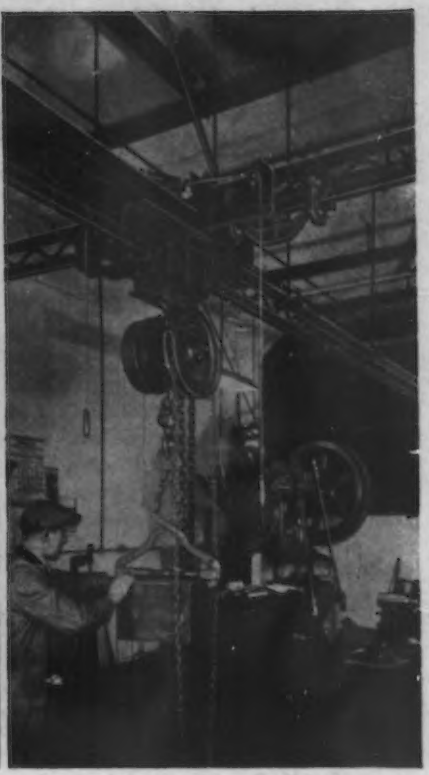
"War experience," it was pointed out, "has demonstrated that the control of wage rates, the most important element in costs, is indispensable to price stabilization. In the light of the newly announced government policy of relaxing wage controls and increasing wage rates in order to sustain purchasing power, firm control over costs, and hence over prices, has been surrendered."

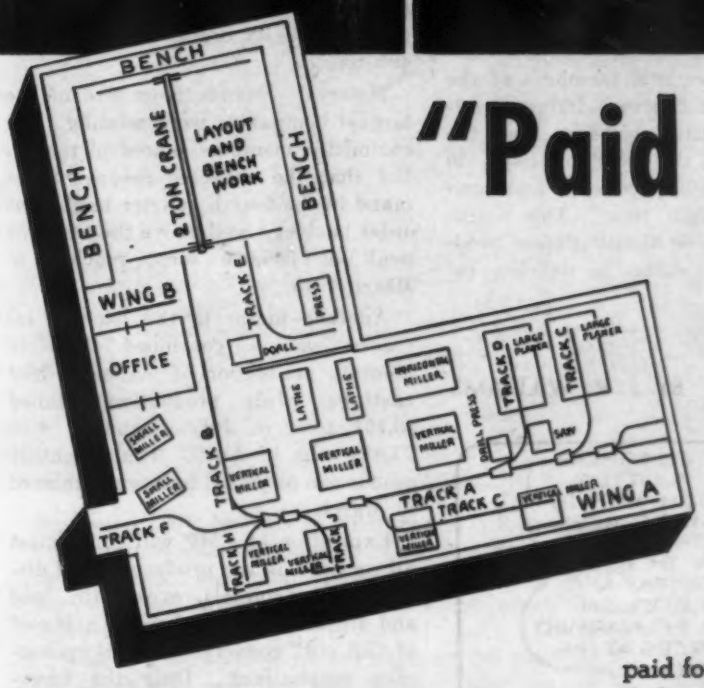
The authors emphasized that they were not contending that wage controls should be continued now that the war has ended.

"There seems little possibility that









"Paid for Itself... Time and Again..."

"THIS system", says the owner, "has paid for itself time and again. Skilled die-sinkers and tool makers now work at their trade and spend little time lifting and straining to get blocks into the machines". Two ton die blocks in this small shop are handled overhead by American MonoRail. When this system was first installed it represented only a small part of the present track. Now, practically all manual handling has been entirely eliminated and every move from one machine to the other is done by American MonoRail.

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any political administration would be willing to undertake the rigid enforcement of wage controls in peacetime," they added.

In connection with the situation confronting the steel and foundry industries which will require higher wage scales to attract labor for increased production in the early postwar period, the report declared that since there are no wholesale or retail distributors who might absorb the advanced cost at the manufacturing level, such price increases would be reflected in production costs in consuming industries. In this situation, it added, the OPA cannot hold the price line without seriously interfering with production and employment in a basic industry and in a whole series of related industries. Moreover, if after time-consuming review of the cost situation in the steel industry an advance is permitted, it was pointed out, then it will become necessary to review price schedules of industries using steel products.

"Without effective control over wage costs," the report continued, "all that OPA can hope to accomplish is to retard price advances by delays in granting price relief or by applying 'the squeeze' somewhere along the line."

The authors also expressed the opinion that price controls should not continue beyond the setting of initial prices for products whose manufacture was suspended during the war.

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Malleable Castings Still Reported In Very Heavy Demand

Washington

• • • **Continued large order** backlogs for malleable iron castings, bulwarked by reconversion needs, insure a high rate of operation for the industry over a long period, WPB has announced.

WPB officials told members of the Malleable Iron Castings Industry Advisory Committee, however, that the expiration of the CMP on Sept. 30 would put both producers and consumers "on their toes." One to insure an equitable distribution of products and the other to develop resourcefulness in obtaining materials without government priorities assistance.

Reconversion needs put almost as great a burden on the malleable iron castings industry as war demands, industry members and WPB officials agreed. They cited the continued demand by the automotive industry for castings needed for gear housings and other automotive parts which in many cases called for the same product in peacetime as in war.

Evidences of large post VJ-Day cancellations on this type of castings are lacking to date, according to Steel Division officials. Victory in Europe brought a drop in order backlogs for July to 426,739 tons from 504,200 tons in May, 1945. Incomplete reports received to date on August backlogs do not offer any evidence of substantial declines. Reports of some 81 out of 116 reporting companies showed August orders totalling 262,495 tons.

However, reports from five of the largest companies were missing. All committee members shared in the belief that the expected resurgent demand in the fourth quarter might put order backlogs well above the wartime peak of 506,000 tons, reached in March 1945.

Another factor in the backlog increase was a continued drop in monthly production of malleable iron castings. July production totalled 53,101 tons in July compared with 77,038 tons in April. Peak monthly production of 86,163 tons was achieved in March.

Expiration of CMP will end almost all controls on the production and distribution of metals, except tin, lead and antimony, and ushers in a period of "all out" conversion, WPB spokesmen emphasized. Only the emergency AAA ratings, MM ratings for military needs and the CC rating for emergency civilian requirements remain in force. Scheduling procedure and directives (as specified in the steel order M-21) will continue in effect, however, after the end of the month to complete unfinished production schedules.

The "CC" rating band will only be issued for bottleneck items according to the provisions of Priority Regulation No. 28. Government spokesmen emphasized that manufacturers in need of large quantities of materials must make their own arrangements for production and deliveries without dependence on government priorities assistance.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

IT'S RUDE TO POINT BUT IT'S ACTUALLY CRUEL FOR TH' BULL O' TH' WOODS TO POINT AT A TIME LIKE THIS— YOU WONDER IF YOU'LL BE POINTED OUT NEXT!
THAT GUY THERE WAS A LITTLE TOUGH WITH TH' ARMED FORCES AT TH' FRONT-- NOW TH' BULL IS GETTIN' A LITTLE TOUGH WITH TH' UNARMED FORCES AT HIS BACK!
J.R.WILLIAMS
4-28
T. M. REG. U. S. PAT. OFF.
THE FINGER OF SUSPICION
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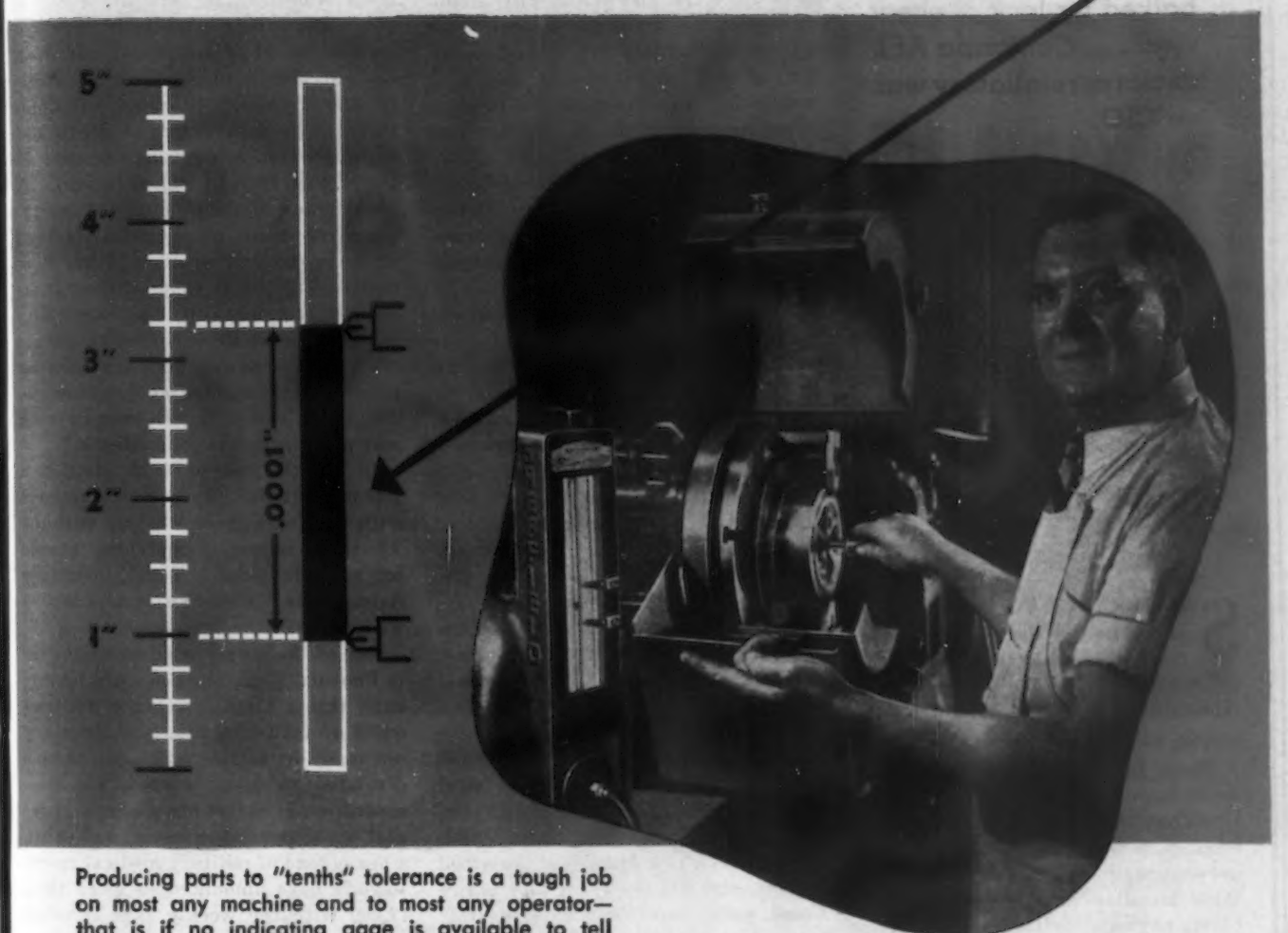
Checking to "TENTHS"

can be like reading inches on a yardstick



Producing parts to "tenths" tolerance is a tough job on most any machine and to most any operator—that is if no indicating gage is available to tell the operator "where he is", and which way "the machine is going."

With a Precisionaire to use right at the machine on which the operator can read "tenths" as he would read inches on a yardstick, he can see "where he is". Working to "tenths" becomes as easy as working to "thousandths". And most important of all, he knows that every piece accepted on the Precisionaire is "right".

Scrap is reduced to a few incorrect pieces possibly made during the machine setup—no additional scrap need result as the Precisionaire tells the operator to adjust his tooling and machine before parts "go out of tolerance".

The Precisionaire checks internal or external dimensions with equal accuracy. It is available in four models of different amplifications for tolerances ranging downward from .005" to fractions of a "tenth". Hundreds of Model No. 600-0 are being used in various plants right at the machine to check to plus or minus five millionths of an inch. Thousands of lower amplification models are used daily in receiving, process and final inspection in the nation's production plants.

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West Coast . . .

OSGOOD MURDOCK

• Industrial decline levelling off with net gain of over 850,000 workers . . . Expansion balked by lack of sheet steel . . . California AFL declares retaliatory war on CIO.

SAN FRANCISCO—The popular conception of the postwar industrial West with vast tabernacles of termination and monuments to mobilization draped with cobwebs and musty with disuse, is fading.

There has been little doubt that many more spectacular sized installations had seen their highest peak of activity, but despite the ballyhoo and overemphasis no one really expected these installations to continue at full blast, anyway, so their closing surprises few but the Sunday supplement readers.

Just below the level of the aluminum and magnesium plants, industry proper is disclosing a surprising number of plans for normal expanded resumption of activity and, in many cases, sound substantial projections for the future. The large majority of firms which constitute the true reflection of West Coast business all have shingles out saying "Business as Usual," and in smaller type, "No Tears—Crocodile or Otherwise—Wanted."

One index to the current situation was supplied by officials of the WMC at a meeting of federal, state and local executives in this city last week.

In 1940 the Pacific Coast employed 3,350,000 people. On Aug. 15, 1945, there were 4,454,000 employed, and last week 4,197,000 people were employed. While 257,000 had lost their jobs since the end of the war, simultaneously five industrial centers listed 84,000 unfilled jobs—the listed constituting only a portion of the total available. This constitutes a (temporary) net gain of 850,000 workers plus families.

Over and above these traceable figures are the projected new factories and expansions which when enumerated sound like a publicity handout from a booster club.

Here and there banks and advisers recommend a short waiting period for new industrial activity until the full implications of labor's demands for increased wages can be measured. Substance of the situation, however, is that there are a lot of new customers in the area who, through local consumption, have greatly reduced the break-even point for almost every type of mass manufacture on the Coast.

In Los Angeles, still considered the most sorely tried area on the Coast, a recent survey of the Citizens Reconversion Council disclosed 113,000 jobs which will become available within 90 days, 58,000 of them in heavy and manufacturing industries. With steel mills quoting six and eight months delivery for galvanized, black and cold-rolled sheets, Los Angeles is described as the tightest spot on the entire Coast, indicating that war plant after war plant is only waiting for material to start production. According to the steel sellers, many of these firms actually have undisclosed new products and reconversion plans up their corporate sleeves and are all set to go.

Under the heading of voluntary terminations it is found that 10 pct of the employed men and 12 pct of the women planned to return home, anyway. Another segment of workers who had come from surrounding communities are also returning to their homes and not seeking re-employment.

In Portland, Ore., during the highest point of layoffs, the WMC was accepting employment applications at the rate of 3100 a day and placing 300 a day. Of these unemployed only one out of five was filing claims for unemployment compensation, indicating that the majority of applicants were exercising the inalienable right of a good American to look for a better job. Portland's population had increased 50 pct as a result of war work and, according to A. Bancroft Wells of the Portland Chamber of Commerce, "We were scared to death, but we discovered to our surprise that 40 pct of that 50 pct planned to stay. A great many of them bought property, improved their places with savings made in the war years, and are now resting—taking it easy. Retail business is booming (up 5 pct according to the Federal Reserve Bank), hotels are crowded, newspapers are running pages of help wanted advertisements, and there are still not enough men and women for the jobs offered."

In Seattle, not hard hit until the Boeing cutback, the WMC reports with overtones from VE-Day that the job there is one of matching people to suitable jobs. Total insurance claims since VJ-Day amount to 20,000 with 8000 in the last week.

One of the sorest tried communities is Phoenix, Ariz. Reasons are apparently three: First, Phoenix is not normally an industrial area and there are not many industries which can absorb displaced workers; second, the concentration of a few big plants disproportionate to total industry, and third, a heavy load of military medical cases. Layoffs have amounted to more than 12,000 with the weekly rate running at around 3000, against a weekly hiring rate of less than 500, constituting the poorest ratio in the West.

A confusing element in estimating western industrial conditions from unemployment lies in the current tendency to use the figure for applications for unemployment compensation. Aside from the well-repeated quirk of vacations - with - compensation, another error factor should be considered. Many applicants file for compensation merely for their own protection while looking for a new job, and others who have found work neglect to notify the bureau.

When officials from the 11 western states sound notes of optimism while under no particular political compulsion, either the outlook is good or the analysts are being mightily deceived. One discordant note is the gloomy prediction of Prof. Samuel May, economist at the University of California,

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Graduate

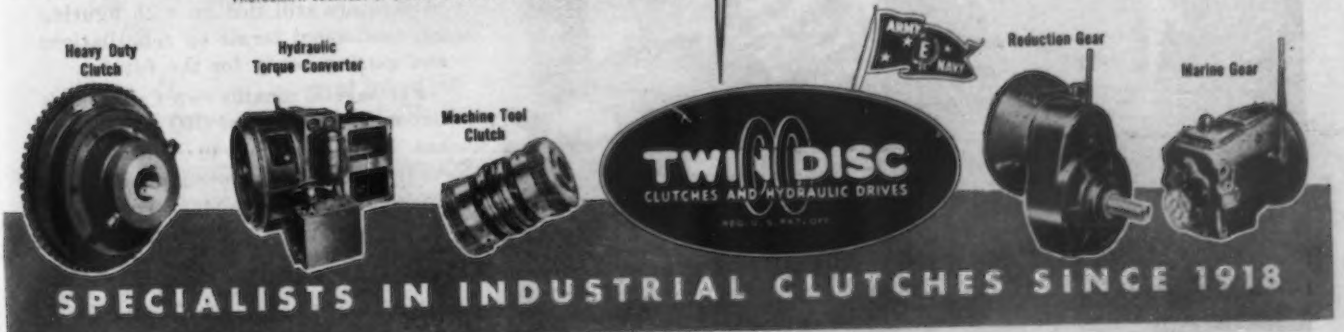
OF THE GLORY HOLE

A molten mass of molecules quickly becomes a shape...an article of practical use...in the practiced hands of this veteran gaffer. Long years of toil and training gave him the touch, this *graduate of the glory hole!*

Just as the glass blower learns his ticklish trade from experience . . . first as a servitor, then as gaffer...so must the men who design and build the vital power links for modern equipment and machines be trained in the "glory holes" of their jobs.

Twin Disc has long recognized this need for broad experience...has long made painstaking research and testing the forerunner of production. As a result, Twin Disc has established a solid reputation among manufacturers and users alike as the builder of *proved power links*...clutches and hydraulic drives that are dependable and long-wearing... simple to service and easy to maintain.

If you have a problem of power transmission or control, why not draw on Twin Disc engineers' 27 years of wide experience? Their recommendations—"friction or hydraulic"—may be the key to a profitable solution. Write TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

"that 1,550,000 presently employed in California must find new jobs."

SURPLUS property in the West continues to be a thorn in the side of industry. As sheets continue tight on the Coast, and one order going the rounds for 100,000 light gage finds no takers, one vice-president in charge of tracking-down succeeded in locating more than 1000 tons of the specified stock at the Army depot at Lathrop. The material may never get much further west than it is at present, but in the meantime it is not being released by the Army or reported as surplus.

In the same depot there sits a stock of wire rope sufficient "to supply the Coast for the next six years," according to eye-witnesses, while local wire rope men beat the bushes of the mining districts, scout the tall timbers for lumber orders and ride the home offices in the East for delivery.

The general feeling regarding the shortage of sheets was not alleviated when it was learned that considerable quantities en route to the Coast, when V-J cancellations struck, were then diverted in rapid fire order to midwestern consumption in private industry, as the Coast sweats out reconversion, badly short of the self same material. Red tape, it is said here, didn't prevent reconsignment of light gage stock, although it did prevent rerouting useless Navy plate.

Industry isn't quite sure whether surplus declaration is going to expedite matters, either. The regional RFC recently held a sizeable sale of trucks in Stockton, Calif., which was widely advertised in western newspapers with the notable exception of those in Stockton. The sale was noteworthy for the size of the crowds which stayed away. In spite of the best efforts of local officials to get approval for the advertisement and sale of a long list of goods from Washington, these efforts have met with no success since July 9 to date. By the time approval does come and the insertion orders are placed with western newspapers, the list will be obsolete and much of the merchandise sold, local officers say.

The vast quantity of plate—which has been declared surplus—almost found a couple of recent buyers. One representative of a Chinese group, currently interested in a new shipbuilding venture, made inquiries and almost inspected the stock. He was deterred by the fact that pressure from local plate mills is holding the price at $2.90. Another blessing from heaven also arrived—almost—when builders of the Arabian pipe line asked if the plate was 40,000 psi yield. If anyone knows how to increase it from 33,000 to 40,000 psi, they can sell a lot of plate.

Pertinent comment on the surplus stocks—both reported and unreported—is that paper work is beginning to eat up the chances of getting a fair return, and while the situation is stagnating along at a great rate, the market is changing from a seller's to a buyer's. Companies in the market for scarce items are beginning to hold off to see what the manufacturers are going to bring out. Pretty soon, they say, the RFC is going to find itself not with some scarce items and some superfluous, but with all cats and dogs. They believe furthermore that unless the government moves fast on the matter it will be too late, at which time the RFC will then find itself in a position of being a hindrance to industry rather than a help.

LOCAL labor is beginning to show signs of crystallizing in the expected direction. Discussions regarding the state institution and road building campaign were a little muddied by labor demands, but too many other factors stood in the way of immediate inauguration for demands to become vehement. However, the recent return of the 200 San Francisco machine shops by the Navy to their owners has precipitated new demands in this volatile field.

Local 68 of the AFL machinists' union whose demands resulted in Navy seizure during wartime and CIO Local 1304 are asking for increases and benefits which amount to 30 pct. Among demands are base pay increase from $1.28 to $1.65 per hr; two weeks' vacation with pay instead of one week; and nine paid holidays.

Boilermakers in the seven western states are also demanding their share of increases for field work, the principal ones being a 6-hr day and an increase from $1.65 to $1.75 per hr.

The demands have not gone into the negotiation stage yet, as employers are still tied up with figuring out settlement terms on cancellations and getting ready for the future.

For several months now California's *Labor Herald*, official CIO newspaper, has been stressing in red captions AFL raids on their membership. This week the California State Federation of Labor, AFL, at a meeting in San Francisco declared open warfare on the CIO "for having proclaimed their intention of organizing jurisdictional raids on the AFL."

FATIGUE TESTING: *This apparatus has been set up for fatigue testing which was employed satisfactorily by the engineering test laboratories of Consolidated Vultee Aircraft Corp., San Diego. The test was concerned with the comparative fatigue resistance of sheet metal bent at various radii and it was desired to maintain accurate control of test loads throughout the test. This was accomplished by using known weights at known distances from the rotating disk. The apparatus lends itself to the application of completely reversed, partially reversed or repeated loads, depending on the centrifugal force which is controlled by the speed of the motor.*

Check these Features of

VICKERS

Variable Delivery PISTON TYPE PUMPS

Among the features indicated below are many of the reasons for the high overall mechanical efficiency and the high volumetric efficiency of Vickers Variable Delivery Piston Type Pumps. Also, the inertia forces of the rotating parts are minimized . . . the cylinders are arranged axially permitting more compact design.

Write for new Bulletin 43-11 which includes description of construction, operation and types of controls, installation drawings, performance characteristics, installation and operating instructions of Vickers Variable Delivery Piston Type Pumps.

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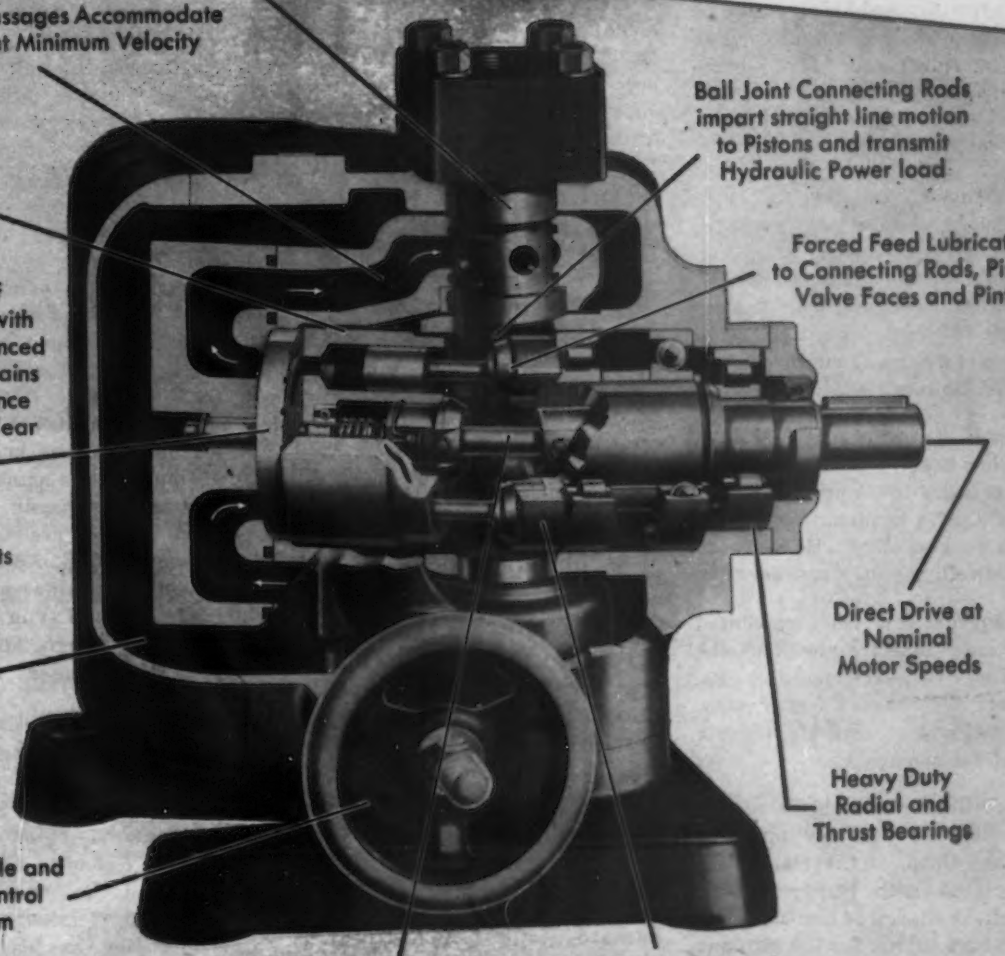
Hydraulically Balanced Pintles
Large Oil Passages Accommodate Oil Flow at Minimum Velocity
Multiple Cylinders Arranged Axially
Valve Plate of Ball Race Steel, with Hydraulically Balanced Valve Face Maintains Optimum Clearance and Minimizes Wear
All Working Parts Submerged in Continuously Circulating Oil
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Ball Joint Connecting Rods impart straight line motion to Pistons and transmit Hydraulic Power load
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Heavy Duty Radial and Thrust Bearings
Driving Flange Integral with Drive Shaft

There Are More Than 5,000 Standardized VICKERS Units For Every Hydraulic Power and Control Function

PERSONALS

o o o

FRANS WETHLY, vice-president, Wilputte Coke Oven Corp.

• **Frans Wethly** has been made a vice-president of the Wilputte Coke Oven Corp., New York. Mr. Wethly has been identified with gas plant and coke oven design, engineering and construction for many years.

• **W. R. Shimer,** metallurgical engineer in charge of sheet, strip and tin mill products, Bethlehem Steel Co., Bethlehem, Pa., will retire as of Oct. 1. Mr. Shimer has been with Bethlehem Steel 38 years. **Felix F. Aloi,** assistant metallurgical engineer, will succeed Mr. Shimer.

• **Herman H. Pancake,** formerly sales engineer, has been appointed manager of mine car sales for American Car & Foundry Co. with headquarters in the New York general office. He succeeds **J. L. McDowell,** recently retired.

• **R. F. Ingram** has been appointed secretary and vice-president of the Landis Tool Co., Waynesboro, Pa. **W. P. Lotz** who was Eastern sales manager will now succeed Mr. Ingram as general sales manager.

• **N. B. Williams** has been named superintendent of the new plant of United Tube Corp. of Cleveland. He was associated with Bundy Tubing Co., Detroit, in charge of electric welding of pressure tubing for the airplane industry.

• **Gordon P. Reif** has been appointed vice-president for sales; **Guy W. Allis,** vice-president in charge of the Richmond, Ind., plant, and **Joseph Stross,** vice-president for purchasing, of Metal Specialty Co., Cincinnati. **Harry M. Forman** has assumed his duties as controller of the company.

• **C. B. McGehee** has resumed his position as general manager of sales of Truscon Steel Co., subsidiary of Republic Steel Corp., Youngstown. **W. D. Morehead,** formerly manager of the erection dept., has been named chief engineer, succeeding **R. D. Snodgrass** who has resigned after 36 years of service. **George McDermott** becomes manager of the erection dept. in Youngstown, leaving his post as erection superintendent in New York City. **C. J. Gelhaar,** has been made sales manager of the Door Div., having been assistant sales manager there. **G. J. Casey** has been named sales manager of the Metal Lath Div.

• **L. P. Cramer,** assistant resident manager of the Fisher plant, General Motors Corp., at Lansing, Mich., has been named resident manager of the Janesville, Wis., div. **E. J. Hanson,** formerly manager of the Ternstedt Trenton div. before the war, has been reappointed to that post. **C. E. Hoehn,** resident manager of the Fisher Tarrytown, N. Y., div. before the war, has been reappointed to that post. **H. B. Lowendick,** manager of the Fisher Grand Blanc, Mich., tank plant, has been named resident manager of the Atlanta div. **M. J. Olson,** who supervised operations of Eastern Aircraft in the Baltimore plant, has been named resident manager of the Fisher Baltimore div. **S. J. Sabourin,** assistant manager of the Grand Blanc tank plant, has been named acting resident manager.

• **Dr. Harry G. Mitchell** has rejoined the Speer Carbon Co. and their affiliate, the International Graphite & Electrode Corp., as advertising manager, after serving as carbon products consultant for the WPB since Aug., 1942. He will be located at the home office in St. Marys, Pa.

• **Del B. Short** has been named sales manager of the Cleveland region of Packard Motor Car Co. Other regional managers named are **R. J. Froiseth, R. W. Cragin, W. C. Herring** and **W. R. Bellows.**

• **Jack T. Dalton** has been appointed manager of distribution of Bendix Aviation Corp.'s Radio Div., Baltimore. Replacing Mr. Dalton in New York will be **W. H. Autenreith,** who has been made district manager.

WILLIAM C. SIMPSON, manager of sales, Lukenweld, Inc.

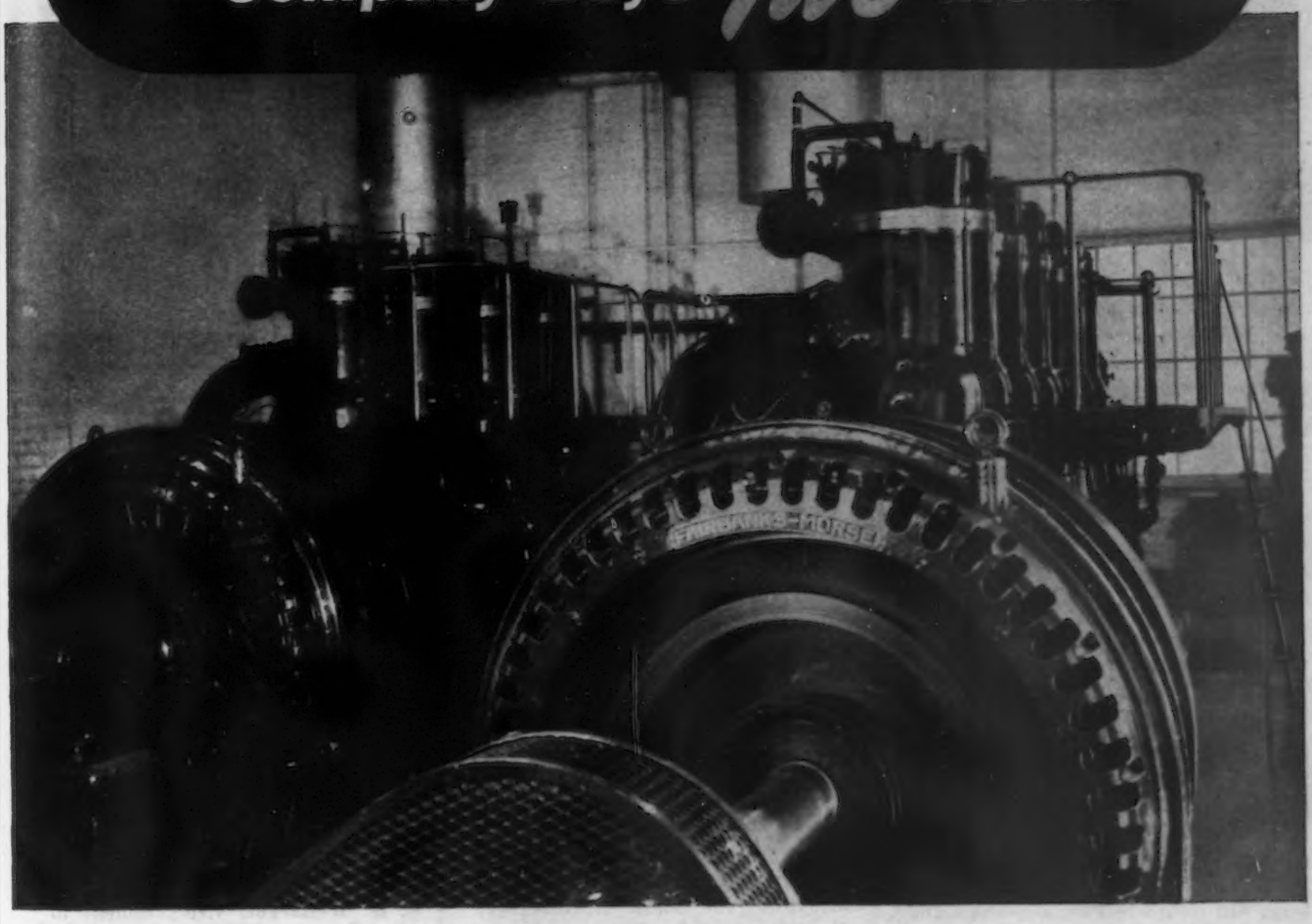
• **William C. Simpson,** who has been associated with Lukens Steel Co., Coatesville, Pa., since 1934, has been named manager of sales of Lukenweld, Inc., a Lukens subsidiary. Mr. Simpson came to Lukens in 1934 from Bethlehem Steel Co.

• **M. D. Brown,** manager of the Louisville branch of the Ford Motor Co., has been made manager of the Oklahoma City branch, succeeding **A. E. Klemmedson,** resigned. **H. Y. Ingram,** manager at Indianapolis, has been made manager of the Memphis branch. **Thomas J. O'Neil,** manager at Memphis, has been transferred to Indianapolis as manager. **C. A. Mills,** assistant manager at Omaha, has been named assistant manager at Chicago; **W. G. Austin** has been promoted to assistant manager at Cleveland; and **L. J. Van Horn,** sales manager at Chicago, has been made assistant manager of the Denver branch.

• **Donald Williams,** formerly with the Philadelphia Wool & Textile Assn. and with Michigan State College, has been appointed general sales manager of Dow Chemical Co., Midland, Mich. **Donald K. Ballman,** organizer of the Technical Service and Development Div. at Dow, has been named assistant general sales manager. **Leland I. Doan,** general sales manager for the past 16 years, assumes the position of director of sales.

• **B. K. Wickstrum** has been appointed Mid-Western sales manager of the Lighting Div., Sylvania Electric Products Inc., with headquarters at Chicago.

Diesel Demonstrates $3,700 Saving – Company Buys *Two* More!



JUST one year of Diesel operation saved the makers of Valdura heavy-duty maintenance paints $3,700 in plant power costs. So, as expansion plans went into effect, two more Fairbanks-Morse Diesels went into operation.

This is a typical experience. Such performance is built into Fairbanks-Morse Diesels. They're designed for heavy duty, economical operation, low maintenance costs, and long life. And Fairbanks-Morse Generators are built the same way. Fairbanks-Morse power generating units are engineered before you get them. One maker is responsible, one guarantee covers them. For information on how you can save on power, write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

BUY VICTORY BONDS

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps
Scales • Magnetos • Stokers • Railroad Motor Cars and Standpipes

• **Hunter Nicholson** has been appointed Los Angeles factory manager of Kelite Products, Inc.

• **L. H. Gegenheimer** is back with the Timken Roller Bearing Co., Canton, Ohio, in his former capacity as sales engineer in the Industrial Div.

• **Felix Doran, Jr.,** has been reappointed general manager of the Fleet Div. of General Motors Corp., New York. **W. L. Shaffner,** who has been acting general manager, resumes his position with that organization as director of national users' sales.

• **H. C. McCaslin,** formerly chief engineer of Willys-Overland Motors, Inc., has been named chief engineer of Graham-Paige Motors Corp., Detroit, and will direct engineering on the Frazer, new automobile to be produced by Graham-Paige.

• **John H. Hall** has resigned his position as assistant metallurgist with General Steel Castings Corp., Eddystone, Pa., and has resumed consulting practice.

• **Harley W. Whitmore** has recently been appointed chief engineer of the Deepfreeze Div. of Motor Products Corp., North Chicago, Ill.

• **F. D. Haberkorn** has been appointed manager of the Sales Training Div. at Caterpillar Tractor Co., Peoria, Ill. **J. W. Mohler,** district representative in the Texas and New Mexico territory, will return to Peoria as assistant sales manager of the Central Div., which position Mr. Haberkorn has vacated.

• **Frank J. Schuman** has been appointed exclusive distributor in the State of California for torque control couplings manufactured by Buffalo Machinery Co., Inc., Buffalo, N. Y.

• **J. Herbert Lund,** formerly sales manager of the Kropp Forge Co., Chicago, has been appointed sales manager of the Troy Laundry Machinery Div. of American Machine & Metals, Inc., East Moline, Ill.

• **Oscar Nuss** has been appointed district manager of the Industrial Rubber Products Div. of Thermoid Co., Trenton, N. J. **Walter B. Chick** has been appointed district manager of the company in the Northwest Pacific Coast area.

• **Trowbridge A. Warner** has been appointed sales manager of Hendrick Mfg. Co., Carbondale, Pa., effective Oct. 1.

WILLIAM T. KELLY, JR., president, Kellogg Div., American Brake Shoe Co.

• **William T. Kelly, Jr.,** has been elected president of the Kellogg Div. of American Brake Shoe Co. Mr. Kelly has been executive vice-president of Kellogg since Dec. 1944. **J. F. Weller,** formerly president of the Kellogg Div., will now devote his full time, as director of automotive sales, to postwar development programs for Kellogg and American Brakeblok Divs.

• **T. D. Adams,** for the past four years president of the Newark Stove Co., Newark, Ohio, has been named chairman of the board of directors. **F. H. Guthrie,** vice-president, was appointed president, and becomes executive officer of the company.

• **William M. Akin** has been elevated from vice-president to president of Laclede Steel Co., St. Louis, succeeding the vacancy caused by the death of his father, Thomas R. Akin.

• **Loring G. Calkins** has been made industrial and sales engineer for Dix Machine Works, Los Angeles, Calif.

• **Thomas W. Benton** has been appointed manager of the New Orleans district sales office of the Tennessee Coal, Iron & Railroad Co., Birmingham.

• **A. W. Pope, Jr.,** chief of research at the Waukesha Motor Co., Waukesha, Wis., has been appointed to a committee of experts sent to Europe by the foreign economics administrator to examine Germany's developments in the engine field.

• **Harry P. Barrand** has been elected a vice-president and director of the Hanson-Van Winkle-Munning Co., Matawan, N. J. **Robert E. Creamer** has been assigned to the New England Territory. **Richard E. Waite,** recently in charge of plating and metal finishing at Stromberg-Carlson, is now with H-VW-M.

• **John R. North** has recently joined Morgan Construction Co., Worcester, Mass., as engineer in the wire machinery dept. He was formerly affiliated with Wickwire Spencer Steel Co., Palmer, Mass.

• **C. G. Wollaeger,** vice-president in charge of sales for Milcor Steel Co., Milwaukee, has resigned to organize the Wollaeger Co.

OBITUARY...

• **Tracy F. Manville,** 65, vice-president, Columbia Steel & Shafting Co., Carnegie, Pa., died Sept. 13 after a short illness. He began with Columbia as a salesman at Boston in 1914. He was also a director of an affiliate company, Edgar T. Ward's Sons Co.

• **Carl S. Neumann,** 65, president of the Union Mfg. Co., New Britain, Conn. and former president of the New England Foundrymen's Assn., died Sept. 13.

• **Charles H. Wilson,** manager of the Fairbanks, Morse & Co., Railroad Sales Div., died recently following a brief illness.

• **Mark B. Graveline,** assistant general superintendent of the Allison Div. of General Motors Corp., Indianapolis, died recently.

• **Frank Kitzelman,** 60, president of the Acorn Iron & Wire Works, Chicago, died Sept. 13.

• **Glenn W. Files,** 48, director of the technical service dept. of General Electric X-Ray Corp., Chicago, since 1934, died Sept. 11.

• **Lieut. James D. Lynch,** 25, on military leave as associate editor of Monsanto Chemical Co. publications, died of malnutrition in a Japanese prison camp on Feb. 5.

• **Joseph W. Koss,** a superintendent at the Pittsburgh works of Jones & Laughlin Steel Corp., died recently.

Where safe, sure footing is IMPORTANT—use JAL-TREAD

THE "SAFETY FIRST" CHECKER FLOOR PLATE

"Safety first" is the vital story of Jal-Tread . . . the new, improved rolled-steel floor plate. Jal-Tread's "checker" design grips each footstep with maximum friction surface at point of contact . . . insures maximum safety underfoot. This square design likewise makes Jal-Tread ideal for fabrication . . . easy to align, easy to fit in place during installation.

Jal-Tread and Junior Jal-Tread are available in a wide range of sizes and weights. The new Jal-Tread booklet tells the complete story of this safer floor-plate that is easy to cut, bend, weld and install, easy to clean and keep clean. Send for your copy now.

Contact your local J&L office or favorite warehouse for delivery information.

JONES & LAUGHLIN STEEL CORPORATION

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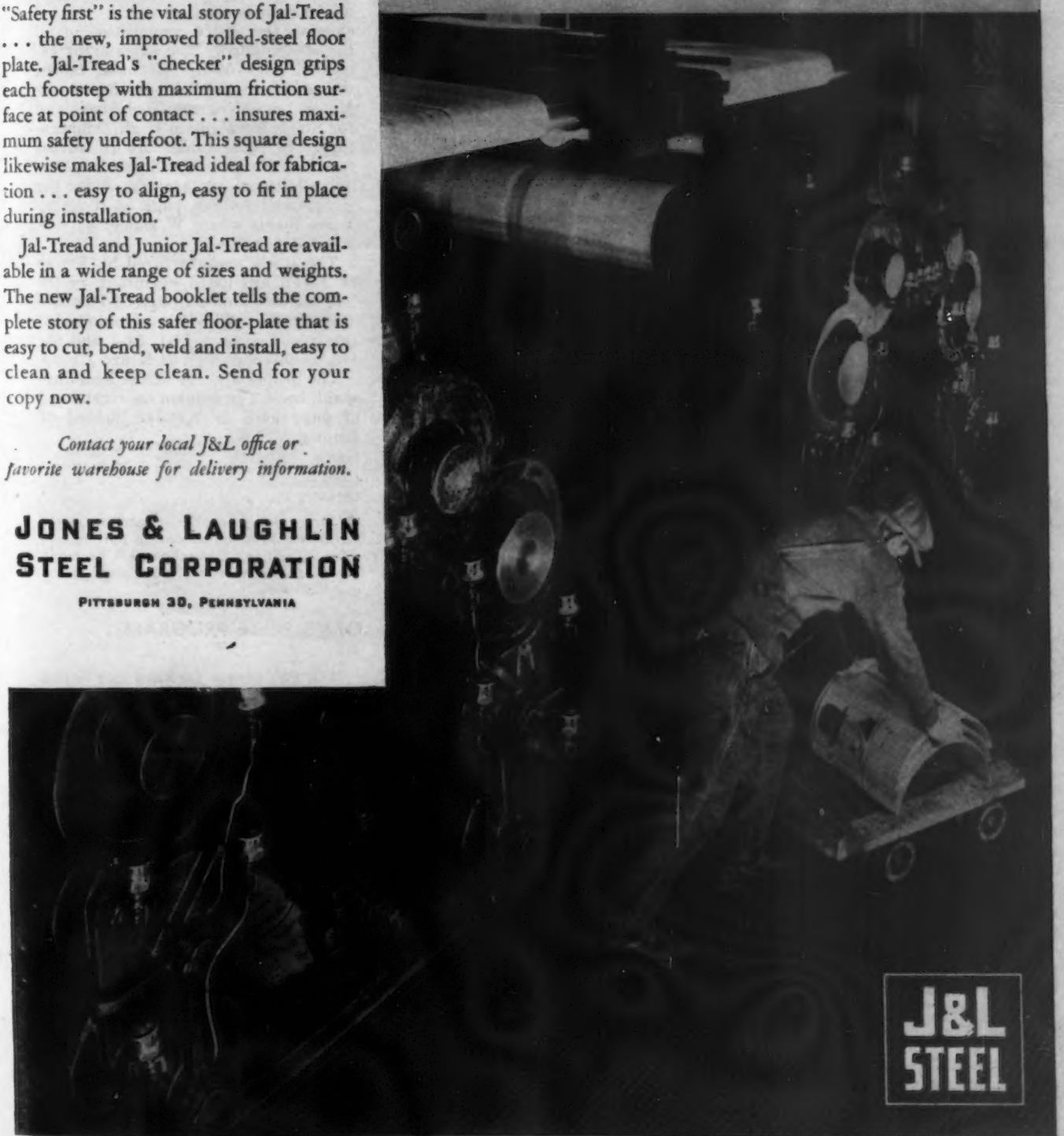


Dear Editor:

ATOMIC ERROR

Sir:

It was with considerable chagrin that we read in the Aug. 23 issue, p. 114, that we were called the Speer Graphite Co. This appeared in the first paragraph of the third column. The International Graphite & Electrode Corp. together with the parent company, the Speer Carbon Co. are the correct names to use. We hope that if reference is made to us in the future that these names will be used.

Among the many articles we have read about the atomic bomb we consider this one appearing in THE IRON AGE the most informative.

H. W. ABBOTT,
Director of Laboratories
International Graphite & Electrode Corp.,
St. Marys, Pa.

NEW SINTERED CARBIDE

Sir:

The engineers of my company in England have read with much interest reference to a new sintered carbide simpler than those used elsewhere in the world and capable of equal or superior performance in cutting operations. This was mentioned in the June 14 issue. Could you give me further information which may be available concerning this sintered carbide?

C. G. RAMSAY
Associated Electrical Industries, Ltd., Schenectady, N. Y.

● See article on German cemented carbide industry, Aug. 30 issue, for further details.—Ed.

NO SHIPBUILDING UTOPIA

Sir:

It would appear that the shipbuilder is approaching a state verging on Utopia, if one considers the article in the Sept. 13 issue by Mr. Hubert as illustrative of that trend. Few shipbuilders familiar with the problems incident to the fabrication of welded vessels are intentionally going to stand in the way of such progress but those very same men will question that the method discussed actually represents any great improvement.

Mr. Hubert's system is definitely workable but there is as much, if not more, room for error in it as currently exists in conventional methods of templating and preparing ship plate. The initial taking of transverse offsets from the piano wires is open to the human element of error in measurement, and when such measurements are taken only to the nearest thirty-second of an inch the entire premise of cutting to tolerances of ±0.003 in. is defeated on the first offsetting operation. Following this the transfer of offsets, first to a wooden template and then to the final sheet metal template or cam, introduces two additional sources of error. Finally, the 11-1 reduction ratio, while it does cause a torch travel of 11 times the cam length results in the reproduction of the original condition of the loft floor lay-out, *plus errors accumulated in the development of the cam,* and provides no actual refinement at all. This reduction ratio has no influence upon the offsets and has the undesirable result that if the loftsman errs in the longitudinal direction when preparing a cam the error is multiplied eleven times in the finished cut.

Even if all the mechanical factors were perfectly controlled in themselves the fact remains that oxygen cutting jets are not ordinarily capable of the control necessary to insure cutting to the tolerances claimed. The variables encountered in oxyacetylene cutting are numerous and any one could cause errors far beyond ±0.003 in. This writer has had considerable experience in cutting heavy plate to close tolerances and it is a considered opinion that with the very best in equipment and the ultimate in engineering control a cut edge that is true within 0.015 in. is the best that can be hoped for.

As far as speed of production is concerned, two straight-line cutting machines operating with a guiding template edge will give equivalent speed without the equipment investment involved, although perhaps requiring more set-up time for cutting any one plate. Either way would eliminate the necessity of the cutting machine operator following a lay-out line. Apparently little time is saved from the loft angle inasmuch as Mr. Hubert states that an application template is required for locating frame lines, water lines, etc., (although many will question the necessity for having such lines on shell plating of an all welded ship).

Finally, this writer is curious regarding the "preheating effect of the post-heating flame." It will be readily conceded that a *preheating* flame ahead of the torch will speed up the cutting operation.

The chief virtue of Mr. Hubert's system would appear to be the use of metal templates which are relatively permanent and can be used for a considerable length of time when a large number of ships of identical design are being produced. Such days are undoubtedly behind us, possibly forever. Further, the floor technique used is adaptable to a man of considerably less skill than would ordinarily be required of a trained loftsman. Otherwise it would appear that there is little to be gained and it is particularly felt that the claims for accuracy are most extravagant.

E. R. McCLUNG,
Welding Engineer
New York Shipbuilding Corp., Camden, N. J.

TUNGSTEN, NOT MOLYBDENUM

Sir:

The writer has noted that his article on German Tool and Special Steels has been published in the Sept. 13 issue and wishes to call your attention to the following errors.

On page 54-G, right hand column, headed Steels of the Edelstahlwerke Works, in either the right hand column or the column next to the right hand column it is headed Mo and it should be W for Tungsten. This is an extremely bad error in that it changes the entire composition of all the steels listed. The same error exists on page 54-H, left hand tables, where W should be substituted for Mo on Low Tungsten Tool Steels and for Steels for Medium High Temperature. In these tables Mo is correct for Drop Forging Die Steels. A similar additional error exists under the right hand column page 54-H under Valve Steels where W should be substituted for Mo.

The steels manufactured by Krupp of Essen are listed beginning in the left hand column on page 54-I headed Tool Steels. All of the remainder of the steels on page 54-I, 54-J and the left hand column of 54-K are Krupp.

The proper address of the Rochlingstahl, headed in column on right hand of page 54-K is Wetzler instead of Leipzig.

J. P. GILL,
Vice-President
Vanadium-Alloys Steel Co., Latrobe, Pa.

● Errors are traceable in part to wrong data from Washington and in part to mistakes in editing. Corrections will be made in all copies sent out separately as requested.—Ed.

OPA'S PRICE PROGRAM

Sir:

Will you please forward two copies of the OPA's Reconversion Price Program as portrayed in the Aug. 30 issue?

D. E. MERRIMAN,
Purchasing Agent
Stanley Works, New Britain, Conn.

● Tear sheets have been mailed.—Ed.

BATH BENDING MACHINE

Sir:

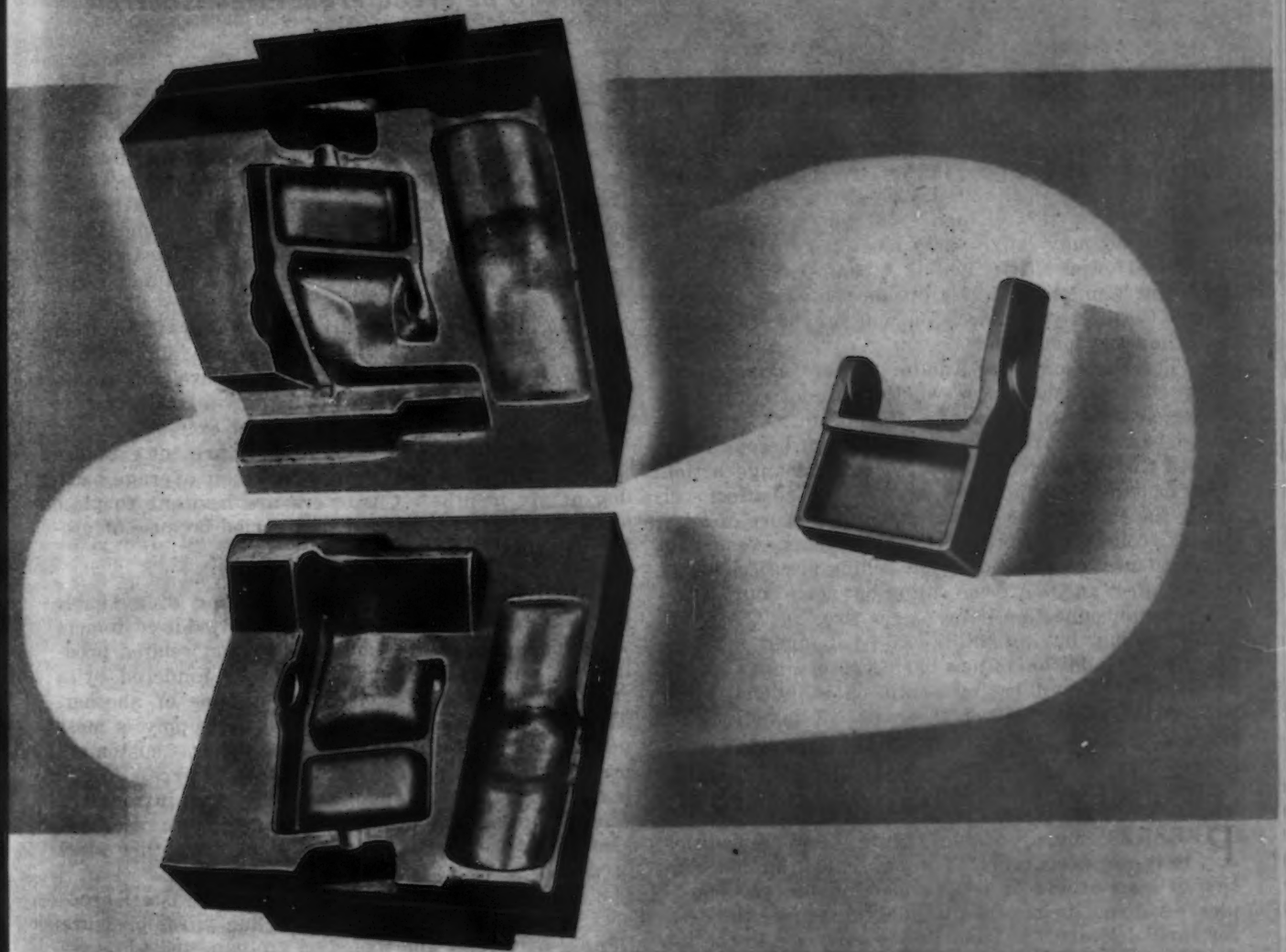
There appears in the Sept. 6 issue a picture and description of a Bath universal contour forming machine in the article "Skin Heating." Will you please send me the name and address of the company making this piece of equipment?

J. E. KUNKLER,
Sales Engineering
Armco Drainage & Metal Products, Inc. Middletown, Ohio

● The maker of this machine is the Cyril Bath Co., 6950 Machinery Ave., Cleveland 8.—Ed.

T & W FORGINGS

Usually Cost Less at the Point of Assembly



● The cost of a forging at the point of assembly is a cost that includes the price paid for the forging plus the time cost of machining and processing it.

T&W forgings usually cost less at the point of assembly, because they are formed to close tolerances and cost less to machine and finish. Ask a T & W Forging Engineer to help you find the difference in the cost of forgings at the point of assembly.

TRANSUE & WILLIAMS

STEEL FORGING CORPORATION • ALLIANCE, O.

SALES OFFICES: NEW YORK, PHILADELPHIA, CHICAGO, INDIANAPOLIS, DETROIT AND CLEVELAND

This Industrial Week . . .

- **Basing Point Changes Expected in 30 Days**
- **Steel Orders Unaffected By Labor Troubles**
- **Some Items to be Freed From Price Control**

THIS fundamental and far reaching change in the steel pricing system, involving the naming of new basing points at or near centers of production of individual steel products, is expected to be well underway within the next 30 days. Producers most adversely hit by this change from the present basing point setup may lag in new basing point announcements. However, it is felt that competitive pressure and the unmistakable significance of the Supreme Court Corn Products decision will provide the necessary impetus for action.

The Office of Price Administration in assembling its material to determine whether or not a price increase is indicated for certain steel products, is understood to have cautiously refrained from becoming involved in the steel basing point price change action. New basing points, however, are expected to affect seriously the earnings of some companies because of additional freight absorption which will be necessary in order to meet competition. The selling practice change might affect an OPA price ruling but some sources say there is no connection between the two.

Customer buying habits will be changed, not only through the addition of new basing points, but through the abolishment of basing points on individual products which do not reflect their site of manufacture. Carried to its logical conclusion, the latter action may seriously upset selling practice on a few individual items.

PRESENT and probable future labor difficulties have not been reflected to any extent in cancellation of steel orders or setting back of delivery schedules. Automotive buyers continue to hammer the desk for early delivery. If labor troubles develop in the industry, steel received may be placed in storage to the limit of facilities.

Such a course would have no immediate effect on the steel mill situation but eventually would be reflected in a request to delay shipment of future orders. Such a request to delay shipment would be welcomed by the mills to provide easing in the jammed up requirement situation for the near term. Any prolonged tieup in the automotive industry would result in a request to delay shipment as soon as storage facilities were filled, thus giving mills a chance to fill the needs of other consumers.

The possible fly in the ointment to such a condition, however, could be a tieup in steel mill production if the steelworker's union or the rank and file should subsequently strike steel plants on a grand scale. Major meetings between the steel union and U. S. Steel Corp.'s subsidiaries have been postponed for a few weeks and in the near future at least, it is unlikely that steel operations on the whole will be severely curtailed by unauthorized strikes.

The informal steel rationing system instituted by steel producers to spread available supplies has in many cases revealed a substantial duplication of orders among steel mills. This disclosure has brought cancellation of substantial tonnages when customers are requested to reduce their orders to actual needs. Cancellations also have resulted from customers who have overordered from one mill so as to establish a broad base in anticipation of informal rationing now taking place.

Because of mills scrutinizing closely their order books and causing elimination of some duplications, new order volume at some mills is at a level only slightly above cancellations thus giving only a small increase in total new business. This small net excess, however, is maintaining mill backlogs in their present extended position with most mills reporting their average backlog at six months. Customers are hesitant to place orders for delivery beyond that period because of production uncertainties.

STEEL mills through their rationing of available material are making an effort to provide customers with sufficient steel of each type so that related products or building projects will not be hindered by a feast of one type of steel and a famine of another. The excess of immediate demand over supply is most pronounced in cold-rolled sheets where customers orders have been closely checked against excess ordering even before informal rationing was introduced. The scarcity of this product may cause more reconversion dislocation for consumers than any other steel product.

Within the next week or so, all alloy steel products, all stainless steel products, fine wire, pressure tubing, wire rope, and tool steel are expected to be released from OPA price control. A partial reason for freeing these items from price restriction is because the supply in most cases satisfies the demand. Most of these items also carry prices higher than ordinary steels and for that reason do not present a price control problem. Even though producers of these products can advance the prices when restrictions are eliminated, such an action is held to be most unlikely in steel circles.

Warehouses will be relegated to a less prominent role in steel distribution in the fourth quarter than that occupied during the war and the first weeks of reconversion with a probable trend thereafter to a status similar to that held prewar. Mills with bulging order books are taking the position that their first obligation is to fill the needs of direct consumers rather than forcing them to secure their steel through warehouses as has been relatively common during recent periods of scarcity.

Steel ingot operations this week were advanced slightly from a revised figure for last week of 83.0 pct to 83.5 pct of capacity.

• **NAVY TRAINED FOR INDUSTRY**—Gradual demobilization of the Naval Air Technical Training Command will allow a flow of over 300,000 technically trained young men into the educational vacuum created when war virtually stripped the student bodies of the nation's vocational schools. Metalworking firms, particularly, will benefit from advanced training techniques inspired by industry itself: Intensive classroom instruction, coupled with a "learn by doing" philosophy, has trained enlisted men in 21 specialties having counterparts in civilian industry, and officers in nine classifications.

• **BETHLEHEM EXPORTS**—The first foreign shipment of steel products since the end of the war directly from the Bethlehem Steel Co.'s Sparrows Point plant, was made recently. It consisted of 5000 tons of steel plates, Sheet steel and sheet bars consigned to the Royal Norwegian Purchasing Agency of the Royal Norwegian Ministry of Supply and Reconstruction. The cargo was to be loaded on the *S. S. Havnann*, a Norwegian freighter, and will deliver the Bethlehem products to the ports of Stavenger, Trondheim, Oslo and Bergen, in Norway. The shipment will mark the resumption of peacetime trade from Sparrows Point with Norway. While many thousands of tons of Sparrows Point products were shipped to foreign countries during the war, they were sent from Sparrows Point by rail to other East Coast ports for distribution into various vessels taking on other war cargoes at the same time.

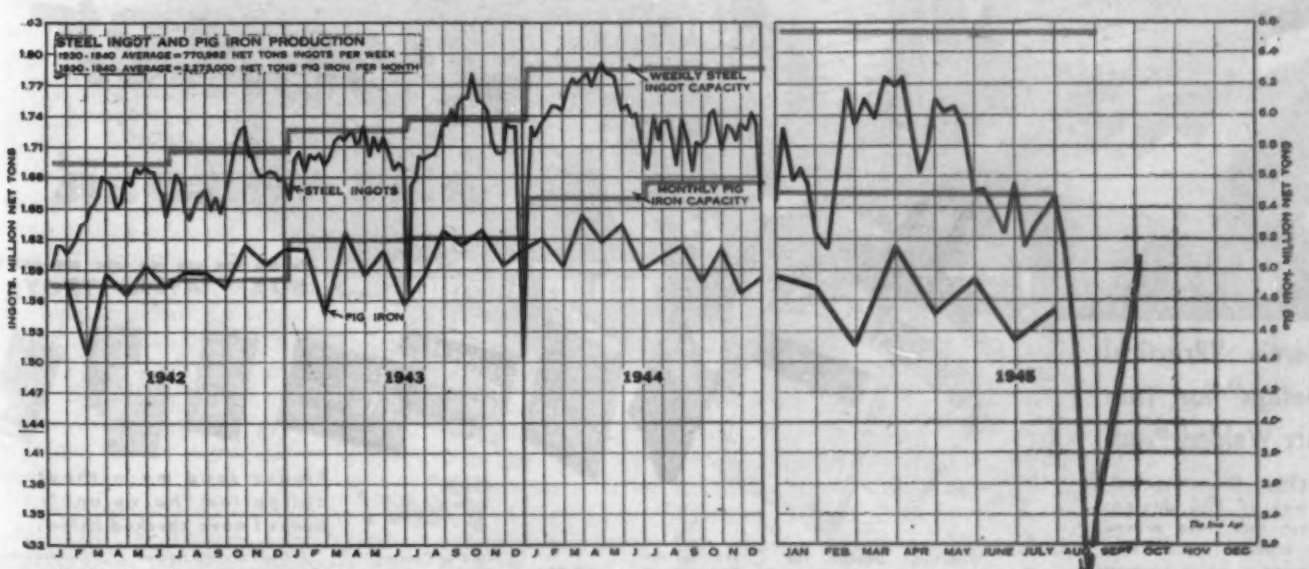
• **IRON & STEEL SCRAP**—Stocks of iron and steel scrap at plants of consumers, suppliers and producers at the end of June 1945 approximated 4,847,000 gross tons, a decline of one pct from the 4,902,000 tons reported on May 31, according to the Bureau of Mines. Consumers' stocks on June 30, amounted to 3,678,000 tons, compared with 3,727,000 tons on May 31, while combined stocks of suppliers and producers were 1,169,000 tons and 1,175,000 tons on the same dates. These figures indicate that consumers and suppliers are holding their stockpiles at a constant level. The sharp reduction in consumption did not result in an increase in iron and steel scrap stocks in consumers' hands because of decreases in production of home scrap and in receipts of purchased scrap from suppliers.

• **GUARANTEED ANNUAL WAGE**—Parker Mfg. Co., Worcester, Mass., producers of tool products and wire goods, has announced a wage policy guaranteeing a minimum of 1800 hr pay annually to each employee with a record of five years continuous employment. Under the plan any qualified employee who fails to receive at least 1800 hr of work in any calendar year, will be paid by the company at the end of the year an amount equal to cover the balance of hours not worked up to 1800, less any amounts received in unemployment insurance benefits, workmen's compensation benefits, sickness, accident and health benefits and wages received from other regular employment. The guaranteed minimum includes vacation allowances.

• **ASKS CHANGE IN F.I.T. PRIVILEGES**—Proposed establishment of fabrication in transit privileges in Western Trunk Line and Southwestern territories upon the same basis as now is applicable in Official territory will be the basis of a joint hearing Oct. 9 in St. Louis before the freight traffic managers committee of western trunk lines and the general traffic committee of southwestern lines. The proposal involves cancellation of fabrication, galvanizing, manufacturing, reworking, zinc coating privileges in transit of iron and steel articles in carloads as well as painting or lacquering tinplate and black plate, stenciling sheets and coating pipe with asphalt or compounds of tar or asphalt base in carloads in the various tariffs of interstate and intrastate traffic with the substitution of rules applicable in Official territory.

• **MERGER ON WAY**—Approval of the proposed CF&I-Wickwire Spencer by stockholders of the latter company was expected to be followed this week with the approval of the CF&I group. Backed by Allen & Co., the move has already been approved by the boards of both firms. According to E. Perry Holder, the president of Wickwire, that firm will not lose its corporate identity in the move. He declined to comment on a possible tie-up with Kaiser for the Geneva operation.

• **INCENTIVE SYSTEM DROPPED**—After having been operated on the incentive pay system for 20 years, the Storms Drop Forging Co., Springfield, Mass., has discarded it for an hourly price range. Price ranges start from $1.10 an hr for top shaper hands, $1.15 for top planer, $1.65 for trimmers and $1.95 for journeyman die sinkers. Apprentice die sinkers get $1.55 an hr at end of their 7 yr apprecenticeship before becoming journeyman die sinkers.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,988 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
WEEKLY STEEL INGOT CAPACITY
STEEL INGOTS
MONTHLY PIG IRON CAPACITY
PIG IRON
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
1942
1943
1944
1945
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
September 18...	73.5*	88.0	86.5	85.0*	87.5	93.0	75.0	95.0	98.5	89.0	56.5	97.5	90.0	83.0*
September 25...	76.0	88.5	87.5	90.0	89.5	93.0	75.0	95.0	93.0	56.5	89.0	97.5	85.0	83.5

* Revised

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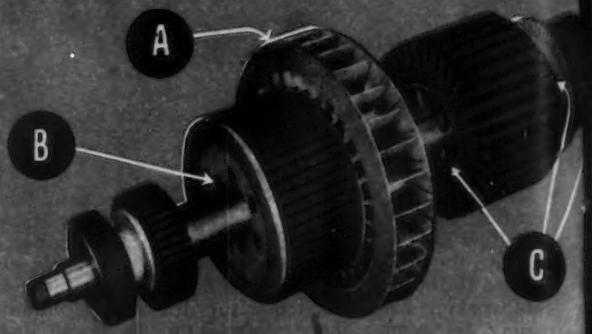

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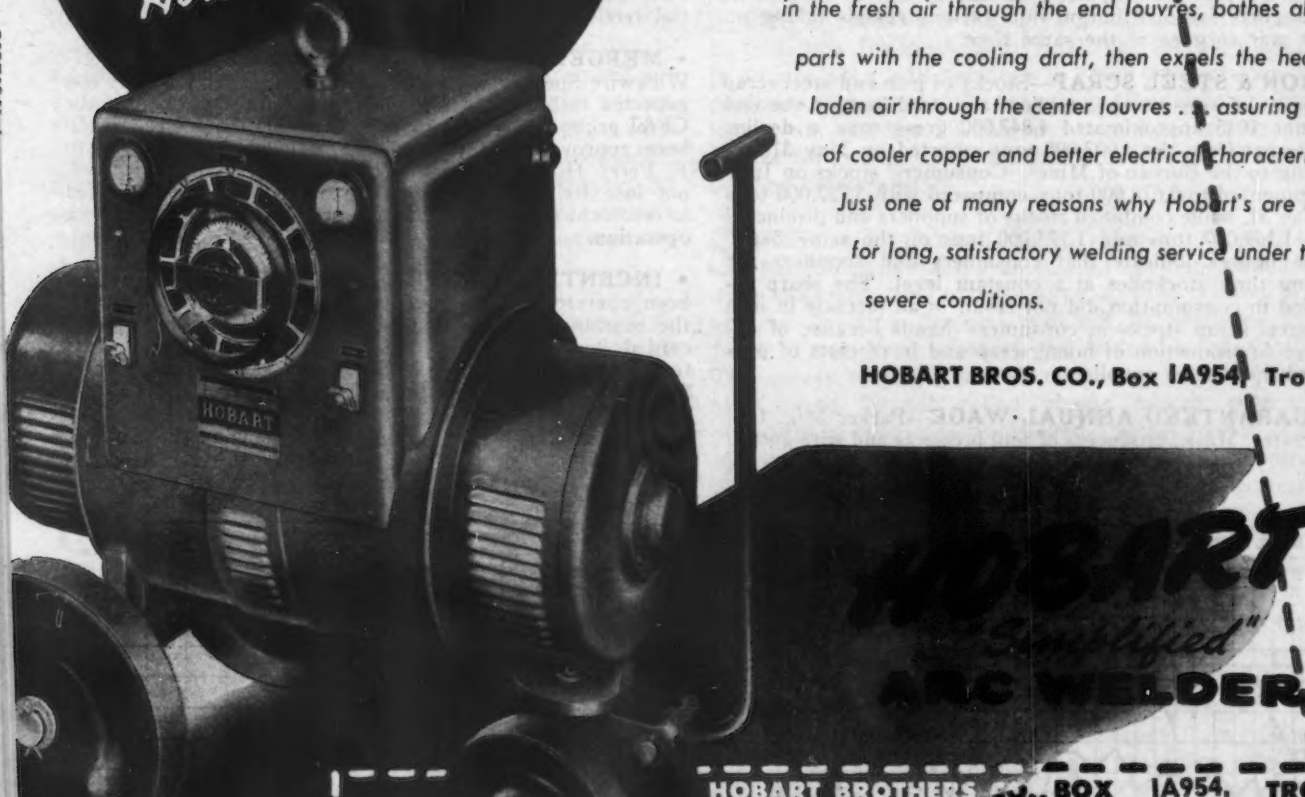

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Basic Change in Steel Price System May Be Underway in 30 Days

New York

• • • **The anticipated** basic alteration of the steel pricing system with establishment at or near centers of production of individual products is expected to be well underway within thirty days. Isolated instances aside from stainless steel product changes have already been made or are in the making.

Although producers most adversely affected by such a change from the present basing point system may lag in announcing new basing points, it is believed that competitive pressure plus the possibility of Federal Trade Commission cease and desist orders will provide a sharp impetus.

As previously stated in THE IRON AGE the immediate cause for the new trend lies in the interpretation of the recent Supreme Court decision ruling against a single basing point system in the Corn Products Refining Co. case. The latter covered a situation where a product was manufactured at more than one location but had only one basing point.

The Office of Price Administration, in gathering data for a possible rise in steel prices, has cautiously refrained from becoming involved in the basing point issue. There is a possibility, however, that the expected basing point system revision might affect any new OPA price rulings although it may not.

Customer buying habits will be changed not only through the addition of new basing points but through the abolishment of basing points on individual products which are not located at or near points of manufacture. An example of this and indicative of future action among other products, was the dropping of Pittsburgh as a basing point for stainless steel wire. This change was made when the single basing point system for stainless steel was replaced by a multiple basing point system a few weeks ago.

It may be some time before the full effects of the basing point system change upon the steel consumer can be adequately determined. There is a strong possibility that buying habits, customer relationships, and even methods of manufacture will, over the next few years, present a far different picture from that which has prevailed since 1938 when a similar expansion in basing points occurred.

It is now certain that this basing point price change when finally completed will mean a considerable increase in freight absorption for the producer and a decrease in freight charges for the consumer. Some of these disadvantages and advantages, however, may ultimately be offset by base price increases. Judging from past history however advantages, at least in part, going to the consumer will stick.

Petroleum Strike Threatens Carnegie

Chicago

• • • **Operations of** Carnegie-Illinois Steel Corp. at Gary, Ind. are threatened by a strike at the nearby Socony-Vacuum and Sinclair refineries which provide fuel oil for operation of the plant's openhearths.

Two of the plant's five openhearth shops can be operated on tar but unless the strike is settled by next week, ingot output will be cut about 50 pct from the present rate with a further drop if the strike continues for succeeding weeks. Operations of other Chicago district plants will not be immediately affected, but are vulnerable if the strike continues for another fortnight. Refinery officials report that shipments will not reach normal for about three weeks after the settlement of the strike.

Rustless-Armco Plan For Merger Announced

Cleveland

• • • **A merger proposal** for American Rolling Mill Co. and Rustless Iron and Steel was brought forward Monday by Charles R. Hook, president of Armco and chairman of the board of the latter firm at a joint meeting of the boards of the two firms. Subject to the approval of the majority of the stockholders of both firms the merger will be on the basis of one share of Rustless common stock for one share in the Ohio firm.

Under the plan, the Baltimore Rustless Plant would become the Rustless Iron and Steel Division of Armco. Total assets of American Rolling Mill Co. as of Dec. 31, 1944, were $189,781,318, compared to $14,788,785 for Rustless, and making a total of $204,570,103 for the proposed new organization.

American Rolling Mill plants are located at Middletown and Zanesville, Ohio, Butler, Pa., Houston, Tex., and Kansas City.

Basing Point Reports

New York

• • • **With interest** in the impending basing point changes made and being made in the steel industry becoming more acute, reference is made to the following stories which have covered the subject.

In the May 3, 1945, issue of THE IRON AGE p. 74 is a discussion of the Corn Products case which is credited with causing the changes in the steel pricing system. The stainless steel basing point change is discussed in the Sept. 13 issue, p. 99. The most recent impending expansion of basing points is covered in the Sept. 20 issue, p. 109.

Price Controls to Be Off Alloy Steel Soon

New York

• • • **Alloy steels**, of which supply is greater than the demand, are soon expected to be released from OPA price control according to steel sources. Sometime ago the Iron and Steel Division of OPA had recommended that this type of steel, along with other products, should be freed from controls as long as supply was great enough not to cause a price problem.

It is expected also that pressure tubing, wire rope, tool steels and fine wire will also be freed from OPA price control. Since stainless steel is classed as an alloy steel, it also is expected to be included in the products which soon will be minus price restrictions.

Such a move means that producers will be free to make any price changes they desire, but inasmuch as the supply of these items is or can outrun the demand for them, it is doubtful if a price increase of any great magnitude would stick.

Sheet & Tube Co.'s Construction Plan Covers Finishing

Youngstown, Ohio

• • • A postwar construction program was announced this week by Frank Purnell, president of the Youngstown Sheet & Tube Co.

Present plans call for the building of sizeable steel finishing units here which will aid Youngstown plants in maintaining steel production and assure steadier postwar employment. Construction includes a large addition to the cold-rolling mill at the Campbell Works, which will add about 200,000 tons a year to its present cold-rolling capacity.

Also included are new wire-drawing facilities at the Struthers Rod & Wire Works. These will aid in making finer wire. While the cost of the improvements were not made public, it was reported that the new wire-drawing facilities alone would cost somewhere in the neighborhood of a million dollars. Planned over a year ago, the cold-rolling mill addition was delayed by the war and material shortages. It is going ahead rapidly at this time and foundations which will add 144,000 sq ft of floor space, are under construction. Erection of the steel work will start Oct. 1 or shortly afterward.

According to Mr. Purnell, the 200,000-ton increase in Sheet and Tube's cold-rolling capacity will mean an additional outlet for about 300,000 tons of ingot capacity. This will be particularly helpful to the Brier Hill Works, which has a smaller proportion of finishing capacity to steel capacity than does the Campbell Works.

Mr. Purnell pointed out that the new cold-rolling equipment will in part replace the old hand sheet mills at Campbell which have operated very little during the war and which were dismantled over a year ago.

Charles Shutrump & Sons Co. has the contract for the foundations, the Fort Pitt Bridge Co. the contract for the structural steel, and the Hunter Construction Co., Youngstown, the erection contract.

Supervisors Tie Up Pennsylvania Mines

Pittsburgh

• • • A spreading wave of strikes in western and central Pennsylvania coal mines, caused by a drive for recognition of its Supervisory Employees Union of District 50 of the United Mine Workers union, began to cast a shadow this week over mill operations.

An early week count showed 21 mines idle in western Pennsylvania, 16 in the central portion of the state. In the western section, idle mines included four of Jones & Laughlin, two of Republic and H. C. Frick (U. S. Steel) one each of Bethlehem, and Crucible Steel. Other idle mines included several of the Hillman Coal & Coke Co., Ford collieries, Wayne Coal, Emerald Coal and Pittsburgh Coal.

The tieup of the Pennsylvania mines alone was cutting off a supply of some 75,000 tons of coal daily. About 16,000 miners were idle, because of the drive for District 50 membership of some 700 supervisors and foremen.

Mills were not immediately affected, but were not believed to have any great supply of coking coal on hand, and any spread of the strike into more metallurgical coal workings can be expected to be reflected quickly in production operations.

Efforts to settle the tieups appeared to be moving in low gear. The National Labor Relations Board was scheduled to begin a hearing Thursday in Pittsburgh on the petition of the SEU for recognition at the J&L mines, filed prior to the walkouts. The company was asking for postponement of this hearing because the strike has broken out.

PEACETIME POWER: *Leadman at Republic Aviation Corp., Farmingdale, L. I., directs movement of giant die into suspended maw of* 4500 *ton hydraulic press. The machine turns out from* 10,000 *to* 15,000 *plane parts per day.*

Brownlee Resigns As Deputy Administrator

Washington

• • • Resignation of James F. Brownlee, Deputy OPA Administrator for Price, was announced by Price Administrator Chester Bowles on Sept. 5. He will return as special OPA adviser at a later date.

Mr. Brownlee who served as Deputy Administrator since October, 1943, resigned due to ill health, Mr. Bowles said, and has been succeeded by Jerome M. Ney, formerly director of the Consumer Goods Price Div.

At the same time, Goeffrey Baker, director of the Food Price Div., was appointed as Associate Deputy Administrator to serve with Mr. Ney.

Prior to coming with OPA, Mr. Brownlee served as transportation director of the War Food Administration before which time he was president of the Frankfort Distilleries, Louisville, Ky., and held directorships of several other companies.

Strikes Affect J & L And National Tube

Pittsburgh

• • • **Strikes affected** operations this week at two major district mills.

The Aliquippa Works of Jones & Laughlin was hit by a series of wildcat walkouts which stopped production in the seamless mill and slowed operations in the tinmill and the wire mill. Blast furnaces were also affected. The disputes generally centered around demands for higher rates of pay, and were not authorized by the union.

The National Tube's National Works at McKeesport saw its output stopped in the openhearths, bessemers, soaking pits and blooming mills. Blast furnaces were affected also. This tieup began when rescheduling of openhearth operations resulted in reduced work for two men.

Strike Vote Date Set For General Motors

Detroit

• • • **The troubled strike** situation here was marking time early this week, going through formalities preliminary to the taking of strike votes and possible strike calls in any or all of the largest automobile companies.

A strike vote has now been scheduled for Oct. 24 to be conducted under National Labor Relations Board auspices, for 325,000 General Motors workers. Similar arrangements were expected to be set up for Chrysler and Ford employees as well.

Meanwhile, the first conference on the 30 pct wage issue which set off the tide of strike threats this month was to have begun this week. Officials of the CIO-United Auto Workers Union had a session scheduled with Chrysler Corp.

Hopes strengthened early in the week for settlement of the Kelsey-Hayes Wheel Co. strike which is considered the starting point for the present wave of troubles. However, the company position that it was through with the auto union, regardless of how the strike ended, was considered a broad stumbling block to a return to work. This strike became the subject of an investigation by the office of Michigan Governor Harry Kelly, who reported that he had been told that "not more than 25 pct" of the idle Kelsey workers actually favored the strike. Meanwhile, the Ford plants, dependent on Kelsey for wheels and brakedrums, remained idle, with more than 50,000 men sent home.

Other strike-born troubles plagued the Detroit area. Gasoline shortages caused by the refinery workers' strikes kept many workers home and made others, dependent on overloaded public transit facilities, late for work.

Blast Furnaces Out

Pittsburgh

• • • **The Edgar Thomson** blast furnace No. 7 at Braddock, Pa., was blown out Sept. 21. The corporation now has three of its 25 blast furnaces in this district out.

Western Electric Leases Studebaker Aero Engine Plant

Chicago

• • • **Western Electric Co.** has confirmed that it has negotiated a lease under which it will use the government-owned Studebaker aviation engine plant here to augment the facilities of its Hawthorne plant. The Studebaker plant is a windowless structure containing approximately 800,000 sq ft of floor space.

Iron & Steel Assn. Elects 1946 Head

Pittsburgh

• • • **Freeman H. Dyke**, assistant general manager of steel works for Wheeling Steel Corp. at Steubenville, Ohio, will be president of the Association of Iron and Steel Engineers for 1946.

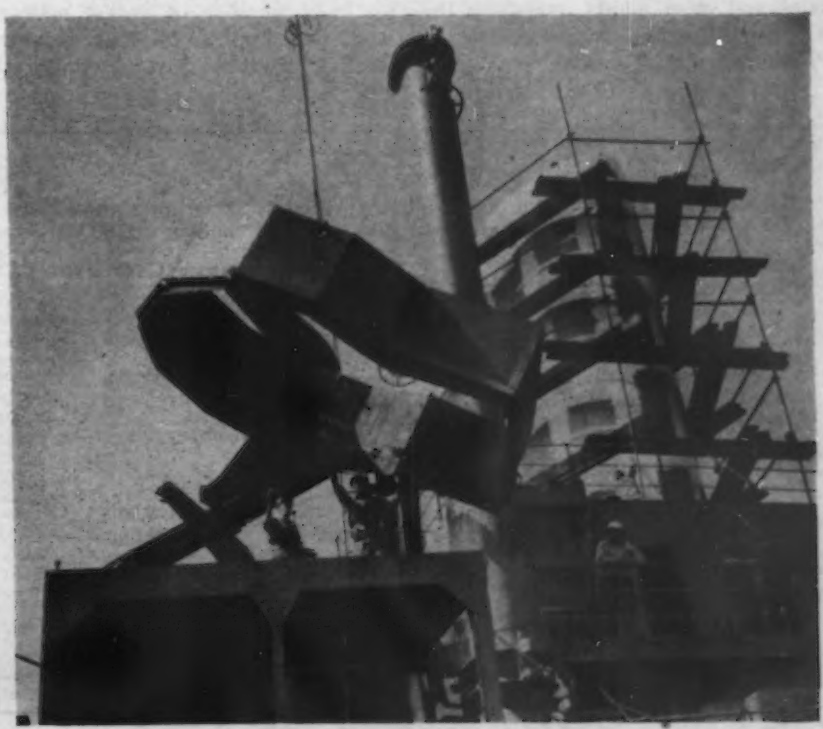
Freeman H. Dyke

Mr. Dyke began his association with the steel industry in 1920 at the Portsmouth, Ohio, plant of Wheeling Steel Corp., and with the exception of three years with Jones & Laughlin Steel Corp., he has been with Wheeling continuously, working in the open hearth and mill metallurgical departments.

He was subsequently appointed chief inspector, and in 1934 became superintendent of hot strip, slabbing and bar mills.

He was made assistant general manager in 1943.

REMOVING WARTIME ACCESSORIES: *A splinter shield, welded onto the cargo ship as protection for the crew of a 20 mm rapid-fire anti-aircraft gun has been sawed loose and is being lifted from an upper deck of the* Lipscomb Lykes, *which is now being remodeled for peacetime uses at the Federal Shipyard, Kearny, N. J.*



RFC Plant Disposal Report Shows Bethlehem Buys at 20 Million

Washington

• • • **Making its first progress report on government-owned plants that it has sold, leased and is negotiating to sell or lease, RFC has disclosed that its largest sales transactions with any single company involved six plants disposed of to the Bethlehem Steel Co., at a total price of $20,206,-572.82, their exact cost to the government. Two each of the plants are at Lackawanna, N. Y., and Bethlehem, Pa., and one each at Sparrows Point, Md., and Steelton, Pa.**

The largest plant in which the wartime lessee has expressed interest in buying or leasing, according to the report, is the huge war built Homestead, Pa., plant operated by the Carnegie-Illinois Steel Co., costing $99,539,000. This United States Steel Corp. subsidiary also is listed as being interested in buying or leasing the $22,895,000 government constructed plant at Braddock, Pa.

The Bethlehem purchases were the only one reported up to Sept. 1 made by any steel company out of the 34 government-owned plants sold. These cost $45,155,000 and were sold for $33,552,000. Sales included metal working, machine tool and aircraft plants and a magnesium casting plant.

In the list of the 62 plants leased, and costing $285,182,000, are forging plants, ferrous and nonferrous foundries and steel plants, including the Allenport, Pa., facility operated by the Pittsburgh Steel Co. This plant consists of tubing facilities and draw benches.

Negotiations were reported at an advanced stage with respect to buying or leasing 61 plants, which cost $875,-928,000. These plants are of so many kinds that they represent an almost complete cross section of the country's manufacturing facilities, covering steel, foundry products, ferrous and non-ferrous, metal-working, machine tools, aircraft, electrical devices and other lines.

In all 157 plants costing over $1,000,000,000 had been sold or leased while the report covered 642 plants, somewhat less than one-half of the total owned by the government.

"The principal objectives have been and are to provide a maximum number of jobs and to maintain industrial production at the highest possible level," the report said. As part of this plan, RFC has leased 47 war plants for an interim period not to exceed 90 days, during which periods negotiations are being continued. In this way, it has been possible in a number of instances to forestall shut-downs while prospective purchasers or lessees are deciding as to the best means of reconverting the plants to peacetime production. As a result, production has continued, and thousands of workmen have been cushioned against unemployment.

"In a number of cases, management has arranged for progressive retooling without shutting down the plant completely. Part of the plant, for example, has been operated while, in another portion, specialized equipment used in making munitions has been removed and machine tools and other production equipment needed for peacetime production has been installed."

As part of its program to assist in the speedy reconversion of American industry from war to peace, RFC has been guided by policies set forth by the Office of War Mobilization and Reconversion, and by Surplus Property Board. According to RFC two key policies in the reconversion program are, first to give preferential consideration to veterans and small business in disposing of small and medium sized plants, and, second, to assure an adequate reservoir of credit for the use, where needed of banks and industry in encouraging the development of both new and established business enterprises. Efforts are also being made to encourage the establishment of new local industries. This activity is based on the premise that full employment can best be achieved by developing new products and new services in which many war-developed products may form the basis, and to nurture local enterprises around war plants built in hundreds of American communities.

In furtherance of this campaign, RFC has taken the following actions:

(1) Distributed a "Briefalog" describing approximately 1000 Government-owned war plants available. This "Briefalog" applies to the manufacturing plant and industrial real estate field a technique developed successfully by the mail order companies in merchandising consumer products.

(2) Prepared brochures containing photographs, plot plans and essential description of plant facilities; and obtained detailed engineering surveys which are available for inspection at each of the 31 RFC offices for a majority of the plants located in that territory. Surveys on additional plants are being prepared.

(3) Launched a continuing nationwide advertising program in daily newspapers and magazines, listing and describing plants and advising prospective purchasers or lessees how to acquire them.

(4) Arranged for conferences at which Surplus Property Board and RFC officials have frequently exchanged views with local groups on the subject of how best to utilize local government-owned plants in the

Washington

• • • **Here is a breakdown of the plants, originally government financed, which RFC has announced have been sold to the Bethlehem Steel Co.**

	Product	Annual Capacity, NT.
Bethlehem, Pa.		
Sintering plant	Sinter	300,000
One 1300-ton blast furnace	Pig Iron	432,000
Blast furnace facilities	Pig Iron	72,000
One 190-ton and one 125-ton open hearth furnace	Ingots	228,000
Two 50-ton electric furnaces	Ingots	120,000
Steelton, Pa.		
70-oven by-product coke plant	Coke	360,000
Blast furnace facilities	Pig Iron	34,800
Sparrows Point, Md.		
61-oven by-product coke plant	Coke	396,000
One 1300-ton blast furnace	Pig Iron	432,000
Three 170-open hearth furnaces	Ingots	538,000
Electrolytic tinning line	Tin Plate	216,000
Bonderizing line	Black Plate	76,000
Lackawanna, N. Y.		
152-oven by-product coke plant	Coke	822,000
Two 1300-blast furnaces	Pig Iron	864,000

development of such communities.

(5) Provided experienced negotiators in each of the 31 RFC offices who are actively negotiating with prospective buyers or lessees of plants.

This sales effort will be further strengthened upon publication of a new and expanded listing of government-owned plants which is scheduled for distribution in late September or early October.

Immediately following Japan's surrender, the War and Navy Depts. authorized RFC to negotiate and, in most cases, to enter commitments for the sale or lease of government-owned plants which had been used by the military services in war production. While the military services have set aside a number of plants in standby condition, they nevertheless have expressed their readiness to consider the sale of any plant sponsored or owned by them provided the services can utilize a substitute government-owned plant to serve the same purpose. Excluded from this blanket authorization, of course, are a small number of plants engaged in production still classed as "secret."

Lone Star Steel Possibilities Studied

Washington

• • • **Preliminary negotiations** are underway between officials of the Lone Star Steel Co. and RFC concerning future disposition of the government financed 1200 ton blast furnace at Daingerfield, Texas.

John W. Carpenter of Dallas, president of the company, has approached RFC with the possibility of establishing a cast iron pipe plant at a reported cost of around $2½ million in order to provide a peacetime outlet for the large volume of pig iron which can be produced there.

This would entail RFC financing the construction of such a facility. RFC meanwhile has ordered an engineering survey to determine the economic possibilities of the plant from the standpoint of peacetime production and further discussions await submission of the report which, it is said, may take some time.

It is understood that the possibility of extending financial assistance to improve or expand any government-owned facility will depend on determination by RFC that it is a sound financial proposition. The RFC, it is said, will exercise considerable care in making further advances of government funds for these purposes.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period JULY - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production: Net Tons	Current Month: Production: Per cent of capacity	Current Month: Shipments (Net Tons): Total	Current Month: Shipments (Net Tons): To members of the industry for conversion into further finished products	To Date This Year: Production: Net Tons	To Date This Year: Production: Per cent of capacity	To Date This Year: Shipments (Net Tons): Total	To Date This Year: Shipments (Net Tons): To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	51	1	xxxx	xxxx	xxx	588,150	182,276	xxxx	xxx	5,170,111	1,365,258
Structural shapes (heavy)	11	2	9,580,550	313,849	40.5	309,323	xxxx	1,995,027	38.4	2,012,260	xxxx
Steel piling	3	3		15,144		17,151	xxxx	139,574		144,075	xxxx
Plates (sheared and universal)	27	4	17,841,320	615,484	40.7	591,982	73,867	5,026,457	48.5	4,919,992	374,309
Skelp	6	5	xxxx	xxxx	xxx	66,357	30,889	xxxx	xxx	451,324	243,789
Rails—Standard (over 60 lbs.)	4	6	3,669,000	190,808	61.3	188,558	xxxx	1,281,876	60.1	1,271,582	xxxx
—All other	5	7	512,000	12,952	29.8	13,306	xxxx	104,540	35.1	104,696	xxxx
Splice bars and tie plates	12	8	1,745,960	64,031	43.3	66,753	xxxx	447,577	44.1	462,281	xxxx
Track spikes	10	9	349,400	12,566	42.4	12,930	xxxx	89,885	44.3	93,274	xxxx
Hot Rolled Bars—Carbon	38	10	xxxx	708,038	xxx	564,195	101,368	5,190,791	xxx	4,072,016	645,977
—Reinforcing—New billet	13	11	xxxx	61,538	xxx	61,700	xxxx	367,309	xxx	371,281	xxxx
—Rerolled	14	12	xxxx	5,179	xxx	6,673	xxxx	44,320	xxx	49,343	xxxx
—Alloy	24	13	xxxx	226,565	xxx	158,674	18,081	1,814,596	xxx	1,313,765	160,163
—Total	46	14	22,381,700	1,001,320	52.8	791,240	119,449	7,417,016	57.0	5,806,405	806,140
Cold Finished Bars—Carbon	25	15	xxxx	145,531	xxx	145,924	xxxx	1,069,895	xxx	1,069,187	xxxx
—Alloy	25	16	xxxx	29,330	xxx	25,565	xxxx	257,759	xxx	234,582	xxxx
—Total	32	17	3,015,910	174,861	68.4	171,489	xxxx	1,327,654	75.8	1,303,769	xxxx
Tool steel bars	17	18	273,010	8,275	35.8	9,187	xxxx	80,550	50.8	80,984	xxxx
Pipe & Tubes—Butt weld	16	19	2,232,520	131,770	69.6	129,570	xxxx	904,103	69.7	881,922	xxxx
—Lap weld	9	20	840,200	43,637	62.0	47,070	xxxx	318,715	66.1	330,211	xxxx
—Electric weld	11	21	1,570,900	83,775	62.9	77,027	xxxx	614,953	67.4	545,024	xxxx
—Seamless	16	22	3,377,700	256,285	89.5	199,501	xxxx	1,828,147	95.2	1,454,924	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	5,874	xxxx	xxxx	xxx	48,861	xxxx
—Mech. tubing (cap. & prod. incl. above)	11	24	xxxx	xxxx	xxx	59,950	xxxx	xxxx	xxx	457,137	xxxx
Wire rods	27	25	7,266,670	357,062	58.0	114,652	39,443	2,678,575	63.5	772,217	269,496
Wire—Drawn	41	26	5,664,690	265,256	55.2	149,815	8,478	2,108,445	64.1	1,264,645	70,363
—Nails and staples	19	27	1,253,360	47,121	44.4	47,210	xxxx	348,560	47.9	353,968	xxxx
—Barbed and twisted	15	28	539,610	18,484	40.4	18,203	xxxx	138,896	44.5	139,133	xxxx
—Woven wire fence	16	29	1,115,860	26,693	28.3	25,650	xxxx	212,437	32.8	210,900	xxxx
—Bale ties	12	30	149,700	6,155	48.5	6,520	xxxx	43,257	49.7	48,086	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	40,945	251	xxxx	xxx	295,971	2,936
—Chemically treated	8	32	465,000	7,525	19.2	7,716	xxxx	67,889	25.1	62,053	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,795,850	188,560	58.6	190,317	xxxx	1,216,778	55.2	1,301,470	xxxx
—Electrolytic	10	34	2,231,850	79,973	42.3	78,765	xxxx	514,811	39.7	533,407	xxxx
Sheets—Hot rolled	30	35	19,197,320	1,154,884	71.0	558,126	43,204	7,937,386	71.2	4,036,648	280,650
—Cold rolled	12	36	7,131,460	396,492	65.6	219,287	xxxx	2,636,363	63.6	1,529,797	xxxx
—Galvanized	16	37	2,915,130	137,635	55.7	137,862	xxxx	1,026,931	60.6	1,020,574	xxxx
Strip—Hot rolled	24	38	7,055,390	223,426	37.4	132,387	19,322	1,601,857	39.1	989,956	159,476
—Cold rolled	35	39	3,119,850	106,363	40.2	101,324	xxxx	829,452	45.8	779,975	xxxx
Wheels (car, rolled steel)	5	40	319,400	24,080	88.9	22,940	xxxx	174,856	94.2	173,487	xxxx
Axles	6	41	408,170	12,159	35.1	13,289	xxxx	87,278	36.8	89,755	xxxx
All other	5	42	190,490	4,071	23.2	3,668	xxxx	28,435	25.7	26,226	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	5,214,074	517,179	xxxx	xxx	39,176,900	3,570,417
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	82.3%	xxxx	xxxx	xxx	91.1%	xxxx

During 1944 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

Canadian Mills Join U. S. In Search for Skilled Steel Labor

Toronto

• • • Industrial leaders in Canada are taking advantage of every opportunity to speed up the reconversion from war to peace production. Insofar as the iron and steel industry is concerned, comparatively few changes are necessary and most plants in this category have attained peak production for civilian requirements and the export markets.

Labor layoffs at the steel mills have been of minor proportion and most of this has been in some of the finishing departments turning out war materials. Actually steel makers are seeking additional help, mostly of a skilled nature to enable them to speed up operations in some departments that have slowed down in the war years when their skilled workers were drafted for war services.

Canadian steel makers are flooded with orders, the greater part of which are from civilian sources. Owing to the policy adopted by some steel companies to hold backlogs as low as possible so as not to be overloaded with business in the event that the government may reconsider and revise price ceilings.

They also adhere to their policy regarding prices to be made known at time of shipment, with the result that consumers have no protection against possible price advance in placing forward delivery contracts and their only advantage is regarding delivery. However, some of the larger steel makers have closed their books for business beyond the end of this year and have very little to sell for the remainder of 1945.

Atlas Steels Ltd., Welland, Ont., whose production capacity was expanded several times its pre-war rate in the past four or five years, has entered upon an aggressive sales campaign to greatly increase export and domestic markets of special steels to enable it to operate at capacity in the post-war years. Atlas now employs 1600 workers, with no layoffs since the end of the war, against around 450 employees in 1939.

It is reported that most of the pre-war export markets have been contacted and many new ones already have been established and an around-the-world sales program is planned. Substantial shipments of tool steel have been moving to Russia and recently orders have been received from Turkey and China, while a number of South American countries have indicated chances for additional export outlets for Canadian steels. Atlas Steels is anticipating an increase of 35 pct in domestic business in view of Canada's increasing demands. With regard to export business, it is pointed out that some lagging has been encountered mainly through delays in foreign countries in negotiating credits.

H. G. Hilton, president of the Steel Co. of Canada, Ltd., Hamilton, reviewing the post-war prospects for the basic steel industry of Canada and his company, stated that reconversion is not a serious problem. Rolled and other basic forms of iron and steel serve the needs of peace as well as the demands of war, and while there are some exceptions, of which shell forgings are a good example, the readjustments necessitated by cancellation of shell and other contracts will not be seriously dislocating.

In the main, he stated, the smoothness of the transition period for steel, will depend more on conditions in subsidiary steel-consuming industries than on those in the steel industry itself, as steel is usually made for re-manufacture. Backlogs of orders for civilian steel are substantial at present and no market decline in steel production is foreseen for some time. It must be noted that repairs have been deferred during the war years, and there will, of necessity, be some close-downs for this purpose. All steel produced from now on will be for civilian requirements and it is hoped that action will be taken in the near future by the proper authorities toward a readjustment of the price structure for iron and steel products which have remained practically unchanged since before the war. Some realism will have to be injected into the control of prices to bring about the necessary relationship between buyer and seller, he stated, otherwise the work of reconstruction may be impeded.

Mr. Hilton pointed out that the Steel Co. of Canada, Ltd., at a cost of approximately $9,000,000 is now rapidly completing the erection of a hot strip mill, and it is expected to start operating in November. This mill with a capacity of 300,000 to 400,000 tons per annum of rolled strip and sheets, is in addition to the plate mill erected in 1941, which made an outstanding contribution to Canada's war effort. With these facilities for the manufacture of all varieties of flat steel completed, Canada will be in a position to produce rolled steel in all the regular commercial forms and sections. Under the pressure of war demands, steel making capacity has been greatly increased and the range of qualities has been extended to the point where Canada can now supply all the ordinary steel requirements of the country.

ROCKET ON SKIDS: *A rare side view of the Me-163B, liquid rocket plane used by the Luftewaffe shows the droppable landing gear and the nose skid which helped to improve performance of the craft.*

British Tinplate Exports Seen Renewed on Greater Than Prewar Basis

Barcelona, Spain

• • • **British tinplate** exports have been renewed on a greater than prewar basis. A contract recently signed with Portugal involves 52,000 standard boxes for delivery up to the end of January, 1946, priced at £2.17.6 c.i.f. Lisbon, Portugal, on a compensation basis (against packed fish, particularly sardines). Greater tonnages of tinplate, the exact amount still undetermined, is to be delivered up to June 30, 1946, on a compensation basis. Also on a compensation basis are 27,000 standard boxes to be supplied to canneries in Northwest Spain and some 19,000 boxes to canned fruit and marmalade manufactures in Valencia. An additional 9000 boxes were sold to Tangier for fish packing and a large quantity will go to West Africa. Tinplate shipments have also been resumed to Switzerland and Italy and about 20,000 boxes were sold to Denmark for condensed milk cans.

The Belgians have sent a commercial commission to the Iberian Peninsula. A proposed commercial treaty with Portugal involves approximately 70,000 tons of steel products for 1946. This does not include 20,000 to 25,000 tons of rails which will be fixed later. The entire supply will be on a compensation basis.

Arrangements concluded with Spain by this commission include hoops, sheets lighter than 28 gage and castings valued at $3,700,000. This too is on a compensation basis. Additional contracts will be signed to supply Portuguese and Spanish colonies, particularly for the re-equipment of railway lines in Angola and Mozambique.

Preliminary meetings of the Belgian, Luxembourgian and French iron and steel industry to regulate export prices have taken place in Paris. Whether this is a forerunner of the steel cartel of 1939 is as yet too early to say. It would seem unlikely since it is not believed that France will have any noteworthy quantity of steel to offer for export in 1946. Unfilled demand for steel in France has been estimated at approximately 1,600,000 tons, which at the present rate of production would correspond to five months' total output.

From Belgium and Luxembourg the first nominal quotations since the cessation of hostilities have been received. These are on an f.o.b. Antwerp basis and are as follows:

Blooms	$28
Sheet bars	30
Steel bars	34
Reinforcing bars	33
Mild steel plates, ¼ in.	43
Sheets, 20 gage	69

These quotations are not compensation prices but free export prices. However, business has not as yet been conducted on this basis, probably because it is still impossible to find vessels for transport from Antwerp.

Steel Mill Repair Parts Are Assured

Washington

• • • **Bringing to an** end efforts on the part of government and industry to get supplies to produce a wartime annual volume of 88,000,000 tons of ingots, WPB officials have made an estimate that virtually all products needed for steel mill maintenance and reconversion will soon be readily available.

In making this announcement at a meeting of the Steel Maintenance and Repair Industry Advisory Committee, WPB said that work gloves and clothes recently in extremely short supply were reported to be available in increasing amounts and should cease to be a problem in the near future.

In view of the continuing critical tin situation, government spokesmen stressed the need for using bearings with low tin content. It was also suggested that industry consider the use of cadmium now in relatively ample supply, which, they said, offers an excellent tin substitute in most bearings. Virgin antimony is still in short supply, WPB said, but pointed out that lead antimony alloy is readily available.

In reviewing the history of the committees' operations, industry men pointed out that the issuance of the P-68 order was the first government order issued by the WPB which granted authority to obtain materials and products to prevent breakdown of equipment. The ability of industry to function under this order forestalled many a shutdown, steel division officials pointed out.

In concluding the committee's activities, the members expressed appreciation of the splendid results which they said had been achieved by Frank A. Weideman, chief of the Maintenance and Repair Section of the Steel Division, and his staff. In turn, WPB officials commended members of the committee for their spirit of cooperation in solving many difficult operating problems during the war.

FROM HELMETS TO SAUCEPANS: *From the thousands of Nazi steel helmets littering the streets of Berlin,* 10,000 *saucepans a month are being made. In the British zone a worker welds on handles and covers sweat-holes.*

Wallace Program Will Re-vitalize Commerce Business Functions

Washington

• • • **Expansion and strengthening** of all the activities of the Dept. of Commerce, including three new Assistant Secretaries, enlarged foreign trade and statistical programs, improvement of technical aids and service to business, particularly small business, and eventual absorption of the Smaller War Plants Corporation are the salient features of a post-war program for the Dept. of Commerce outlined by Secretary Henry A. Wallace.

This program, according to Mr. Wallace, will enable the Department to lend its full weight to attaining his goal of 60,000,000 jobs. The Secretary, at a news conference, predicted an upswing in employment during the coming months but added that the employment situation "warrants the President asking for an appropriation to blueprint public works."

Mr. Wallace also went on record favoring foreign credits provided they are looking toward "expanded world trade on a sustained yield basis."

The reorganization of the Dept. of Commerce, which in Mr. Wallace's words is designed to provide the same sort of service for business as the Dept. of Agriculture provides for the farmer, will require legislation as well as greatly increased appropriations.

In foreign trade promotion the Department will provide all possible assistance to exporters and importers plus the economic analysis and recommendations designed to "increase the supply of dollars in the hands of foreign nations."

Statistically, the program to meet reconversion requirements includes:

1. Full scale census of manufactures, mineral industries, and business (including retail, wholesale, and service trades, and contract construction) for 1946.

2. A sample census of population for 1946 to provide business with current information on shifting markets.

3. A consumer income survey to provide business with indexes of purchasing power.

4. An expansion of the present monthly report on the labor force to provide employment and unemployment information quarterly for the major industrial areas of the nation.

The long-run statistical program includes:

1. Full scale census of manufactures, mineral industries and business every 5 years.

2. Complete censuses of the population, housing and the labor force and agriculture every 5 years to give the business community badly needed information on local markets.

3. A full program of current statistics on manufactures, business, population, housing and the labor force.

4. A series of annual consumer income surveys to provide proper indices of buying power.

5. A strengthened series of import and export statistics to provide basic data to the foreign trade community.

6. Coupled with this would be an expansion of the statistical analysis work now performed by the Bureau of Foreign and Domestic Commerce.

Mr. Wallace's program for technological aids to business include:

1. A technical advisory service, responsible not only for drawing on the work of the Department's own technical bureaus but also for making available to the small businessman the products of science and technology generally.

2. Promotion and extension of services offered by the Bureau of Standards—including, for example, the research associate plan, by which groups of smaller manufacturers can send to Washington a technician who can work out specific problems for them with the aid of the Bureau's laboratories and staff.

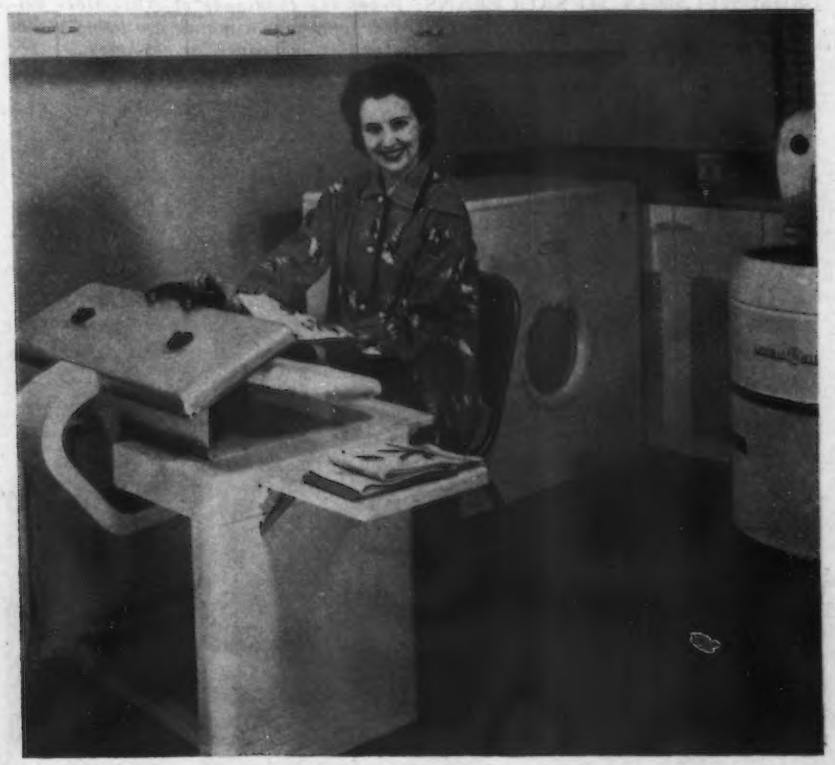
3. General research on widespread industrial problems, particularly those affecting the smaller manufacturer.

4. Undertaking on a cost basis, technical research work on specific problems for individual enterprises, where commercial facilities are not readily available.

5. Vigorous promotion of existing commercial standardization work of the Bureau of Standards to increase the efficiency of industrial and distributive practices.

6. Continuation of the activities of the National Inventors Council, and extension of its activities to peace-time as well as war-time needs, so that it may serve effectively as a clearing house for needs and inventions and may publicize

MORE SHEET DEMAND: *Pushing the demand for steel sheets will be countless additions to the already broad home appliance line. This new General Electric Presser is only one of many new items.*



and promote new processes, new materials and new products.

7. Most effective possible distribution to industry of scientific and technological material developed during the war, including both the material seized from former enemy sources and American material now being declassified from security restrictions.

8. Increased stimulation and utilization of inventions through modernization of Patent Office procedures and practices. A more specific program will be formulated on conclusion of the study now being conducted at the instance of the President.

Under the heading, "Management Aids to Business," Mr. Wallace says: "The idea here is not only to increase the number and quality of business aid provided by the Department, but to make certain that they get into the hands of businessmen who need them, in a form which the businessmen can use." Included would be:

1. Basic market analyses, including marketing guides and the publication of facts bearing on the market potentials of various areas for particular products.

2. Studies of trade regulations, analyses of the causes of business failures, and the preparation of lists of industrial and business establishments.

3. Business operations studies, including analyses of layout practices, stock control systems, purchasing policies and the problems involved in entering new lines of business.

4. Cooperative studies and services with university schools of business to expand the informational and service resources available to business.

5. Industrial relations studies including the application of management techniques and methods of increasing efficiency and productivity.

6. In general, studies and analyses aimed at giving business and especially the small businessman the material he needs to shape his own policies and make his own decisions on his own problems.

In addition to the present Assistant Secretary for Air Commerce, there will be Assistant Secretaries for International Trade, Industrial Economy, and Small Business.

The Assistant Secretary for International Trade will act as the Department's spokesman in dealing with the Department of State on commercial policy, trade agreements, and the commercial officers of the foreign service. He will also maintain close contact with business, the foreign trade community, and be responsible for execution of the foreign trade promotion program.

The Assistant Secretary for Industrial Economy will be responsible for liaison with the business community, the formulation and execution of programs for promoting, fostering, and developing domestic commerce, and the development of the Department's programs and policies relating to the analysis and dissemination of basic information on the manufacturing, distribution and service industries.

The Assistant Secretary for Small Business will be concerned with the special problems of small business. It will be his task to develop and execute programs designed to assist small business with specialized technological, laboratory, marketing research, management aid and other services which small business is unable to provide for itself.

Curtiss-Wright To Desert Biggest War Plant in Buffalo

Buffalo

• • • Plans of Curtiss-Wright Corp. to move production of commercial and military aircraft from Buffalo to Columbus, O., "after present commitments have been completed," has been disclosed in a notice to supervisory personnel, signed by John Lee, general manager here.

While there is a possibility the company will maintain its $4,000,000 research laboratory in Buffalo, both the Kenmore and Airport plants are expected to be vacated by the middle of 1946.

In an invitation to engineering personnel and production chiefs to move to Columbus, the company said:

"Existing C-46 projects, the CW-20-E and similar new proposals are to have their present commitments completed in Buffalo, both with regard to engineering and construction, following which the personnel will be moved to Columbus. "

This decision apparently marks the end of Curtiss' negotiations to lease a part of the huge Airport plant

GOVERNMENT SURPLUS: *Cleaned and prepared for shipment, these government-owned machine tools are awaiting the arrival of orders for shipment out of Chevrolet's Flint plants. Note the blocking in the machine, designed to prevent damage to working parts. Paper covers are applied for protection.*

Navy Air Technical Training Fills Vocational Education Vacuum

Chicago

• • • **Gradual demobilization** of the Naval Air Technical Training Command will allow a flow of over 300,000 technically trained young men into the educational vacuum created when war virtually stripped the student bodies of the nation's vocational schools.

Metalworking firms, particularly, will benefit from advanced training techniques inspired by industry itself. Intensive classroom instruction, coupled with a "learn by doing" philosophy, has trained enlisted men in 21 specialties having counterparts in civilian industry, and officers in nine classifications.

Early in the war, as the command was getting the feel of its wings, over 100 of its training schools were located at manufacturing plants with company personnel framing the curriculum and acting as instructors. As the Navy obtained its own facilities most of the schools moved, taking along industry's instructors and supervisors either in or out of uniform. Schools continued to be maintained in many major aircraft plants, at such firms as Pioneer Instrument Co. and Sperry Gyroscope Co., and at the University of Chicago and Curtiss Technical Training School.

Rear Admiral H. S. Kendall, U. S. Navy, who headed the command capsuled its corollary function of training men for industry thus: "These men to whom the Navy has given thorough training in electronics, combustion engines, specialized training in all fields of aircraft maintenance and repair are the men who will return to civilian life well qualified for good peacetime jobs."

Industrial personnel directors who have been hiring men by the touch system—to see if they are still warm—and management of smaller firms which have not had the luxury of job aptitude testing will get a manpower bonus in ground school sailors who have met rigid qualifying tests for entrance into even the basic specialist schools. Qualifications for advanced courses all include experience and re-screening following basic training.

To demonstrate the scope and intensity of training, the basic course for aviation metalsmiths, for instance, runs 21 weeks. The curriculum includes mechanical drawing, blueprint reading, mathematics; repair and manufacture of fittings and brackets; repair of structural members; welding of carbon and stainless steel, and aluminum; repairs to fabric covered surfaces; inspection, removal and installation of self-sealing fuel cells; removal instalation, aignment of controls, disassembly, assembly, rigging of aircraft.

The dvanced metalsmith course takes an additional 14 weeks and includes arc welding, aluminum welding, and silver soldering; heat treatment, including composition and identification of metals and heat treating processes of aircraft metals; metal finishing, including corrosion prevention, anodizing, parkerizing, passivating, metalizing and electro plating with cadmium, chromium, copper and nickel; repair of nonmetallic aircraft structures, including plastics, fuel cells and flotation gear and aircraft fabrics; woodworking, including use of woodworking tools and machinery and woodworking practices; advanced sheet metal repairs of skin and internal structure; advanced work in aircraft assembly and rigging, including alignment of aircraft parts, removal, installation and adjustment of controls; and responsible modification work which training on requisitions and procurement procedures.

Machinery manufacturers and maintenance department concerned with hydraulic equipment should greet with open arms petty officers who have completed the 12-week advanced course on hydraulic maintenance. Basic units of hydraulic systems and the principles that govern them are studied first hand under close supervision of competent instructors. Working with actual equipment, students investigate power and miscellaneous units, testing Vickers seven piston pumps and becoming familiar with many hydraulic pumps such as the gear and vane type. They study oils, packing, reservoirs, leaf valves, flow dividers and their functions, tearing down units, checking, reassembling and troubleshooting.

Special instrument trainees take an advanced course of 18 weeks beginning with basic maintenance and emphasizing development of shop skills essential to service and installation of instruments and instrument systems. Though tied to aircraft requirements, training in electrical instruments begins with study of basic electricity, runs through the theory and operation of electrically controlled aircraft instruments, including procedures for calibration and repair. Work on jewel-like aircraft instruments provides a good foundation for the industrial world with men thoroughly grounded in testing and repair.

Maintenance of intricate special

LEARNING REPAIR TECHNIQUE: *Cowling repair shop provides tooling and equipment for aviation machinists to learn newest repair techniques.*

aviation devices demand skilled men who thoroughly understand the operation and make-up of all devices founded on mechanical and electrical principles. Basic training for special aviation devices was located at the University of Chicago where trainees chosen for high mechanical aptitude and knowledge of electricity first were reviewed in basic physics and electronics to provide necessary technical knowledge, then trained in shop techniques, and finally given intensive work in overhauling, maintaining and troubleshoting all types of special aviation devices.

Other basic, advanced and specialized courses are equally thorough. Aside from those mentioned, course titles include aviation machinists mate, aviation ordnance men, aviation radar operators, radar equipment repair, aviation communications, aviation engineering officers, line maintenance or numerous types of aircraft, aircraft carburetors, aircraft engines, aircraft propellers, turbo-jet superchargers, airborne electronic maintenance, aviation electricians mates, aviation ordnance men, aircraft turrets, aviation storekeepers, radio and radar beacons, air navigational radio aids, aerographers mates, parachute riggers, photography, camera repair, motion picture camera, printers school including special work in lithography, and many others .

Training techniques selected for the program embody motion pictures, procedure boards, models, mock-ups as well as more conventional class room methods. Textbooks have been "de-Greeked" by special writing teams and are revised frequently. Headquarters of Naval air technical training, of which Rear Admiral Felix B. Stump, U. S. Navy now is chief, are located at Pensacola, Fla.

Monsanto Plans Expansion

St. Louis

• • • **Monsanto Chemical** Co. is considering 151 construction and expansion projects involving an estimated $48,400,000 as part of its postwar program, the company has announced.

The program, according to Francis J. Curtis, vice-president in charge of long-range planning, is being studied in the light of tax, labor, and political factors after having been justified upon the basis of market potentials. Aside from construction and expansion expenditures, additional working capital would be required, Mr. Curtis said.

Superseniority Provided For All Wartime Replacement Veterans

Washington

• • • **Squarely meeting the contention** that re-employment of a veteran would be "impossible or unreasonable" if he displaced a non-veteran worker with greater seniority, Selective Service ruled on Sept. 24 that the provision applies only to the employer and "that consequences to third parties are not involved."

This about-face by Selective Service, in effect gives superseniority rights to wartime replacements who were subsequently called into the military service.

Under the earlier interpretation, protection afforded veterans covered only those preservice jobs which were "other than temporary" and wartime replacements being considered temporary employees were not afforded re-employment rights.

"In determining whether or not a position was temporary," Maj. Gen. Lewis B. Hershey, Selective Service Director, said, "All the facts and circumstances relating to the employment relationship must be considered." Before a veteran is deprived of re-employment rights, it must be shown clearly that his employment was temporary and borderline cases should be resolved in favor of the veteran."

Under the superseniority interpretation of GI re-employment rights which was recently upheld by a Federal Court, the veteran has an absolute right of reinstatement to his former job or to one of like position, status and pay.

Selective Service specifically stated that returning veterans cannot be compelled to join a union, even though a closed shop agreement may be involved. This policy had previously been enunciated, although it did not specify "union membership."

A situation which can come about as a result of the new ruling would involve a number of claims to the same job. For example, a man hired to replace a worker entering the armed forces automatically earns re-employment rights when he enters military service. When two or three men who have successively worked on the same job return from the war, each has a right to the job or one of like position, status and pay. Under the new ruling, the first man having claimed his old job, his replacements, as veterans, must be rehired no matter what non-veteran workers must be replaced.

In those instances where employed workers waived re-employment rights, Selective Service ruled that such waiver did not constitute proof that the job involved was a temporary one. It was also stated that a job "for the duration" or other period is a job "other than temporary."

GERMAN JET: *Object of considerable interest on the part of American aeronautical experts is the Daimler-Benz turbo jet unit, on test in Germany. This unit was not, however, as famous as the BMW* 003 *unit, thought by many to be superior to American types.*

Industrial Briefs . . .

• FORD SELLS—Ford Motor Co. has sold its property at Seventh Ave. and Santa Fe St., Los Angeles, to International Detrola Corp., Detroit. Ford officials indicated that another assembly plant will be constructed in the Los Angeles area for assembly of Lincoln and Mercury automobiles.

• CANADIAN PLANT—The Wales-Strippit Corp. has formed a Canadian subsidiary known as Wales-Strippit of Canada, Ltd., at Hamilton, Ont., with a view to expanding servicing and engineering operations in the Dominion.

• NEW FOUNDRY PLANT—The Waukesha Foundry Co., Waukesha, Wis., has completed plans for the construction of a branch plant at Watertown, Wis.

• METAL FIRM EXPANDS—C. R. Daniels Metal Products Co., heavy-duty machinery, has purchased the south factory building of the Eclipse Molded Products Co., Milwaukee.

• NEW COMPANY—Sturdy Tool & Gage Co., Detroit, has been organized by Al Robinson, formerly president of Lincoln Park Tool & Gage Co. Production will include tungsten, carbide, plug, ring and builtup gages, as well as chrome plugs and rings.

• TRAVEL LUXURY—Plans for a "living room" car with casual seating arrangement, lounge chairs with reclining backs and folding ottomans, have been developed by Pullman Standard Car Mfg. Co. Lounge chairs are arranged in groups, including movable seats, which may be utilized to form new combinations with fixed groups of chairs.

• AWARDED CONTRACT — The Stanley Works has announced the award to the Turner Construction Co., New York, Boston and Philadelphia, of a general contract for two manufacturing buildings at its New Britain, Conn., plant.

• RECONVERSION CHECKLIST—Wartime controls and regulations which have been removed and those which are being carried over into the reconversion period are outlined in a reconversion checklist mailed to 9700 industrial and commercial firms in the Chicago area by the reconversion problems service of the Chicago Association of Commerce.

• FOREIGN MANAGER—Kenneth Campbell of San Francisco has been made manager of the U. S. Chamber of Commerce's foreign commerce dept. The position has been vacant since the resignation several months ago of Edward L. Bacher.

• BREWERIES EXPANDING—Two Milwaukee breweries are announcing huge expansion programs to increase outputs. Pabst will spend $2 million and Blatz contemplates laying out $3 and a half million.

• SQUARE D BUILDS—The Square D Co. is making plans to double the capacity of its Milwaukee plant at Richards and Capitol Drive.

• PLANT ADDITION — Walker-Turner Company, Inc., Plainfield, N. J., have broken ground for an addition to plant No. 2. The new construction will add 75,000 sq ft to the floor space of this plant and will cost $300,000. Plans are completed, also, for increasing the area of plant No. 1.

• WESTINGHOUSE CONSTRUCTS—Construction of a $406,000 industrial building at the East Springfield works of the Westinghouse Electric Corp., containing 100,000 sq ft of space, will start immediately. It will be used for the manufacture of coolers for a national beverage concern. Stone & Webster, Inc., is the general contractor.

WPB Revises Rating System Covering AA

Washington

• • • Announcement was made on Sept. 24 by WPB that orders rated AA which were originally accepted and scheduled for delivery by Sept. 30 but which due to circumstances beyond the supplier's control are delayed in delivery, will be void after that date, and must be treated as unrated. The explanation was contained in Interpretation 1 to Priorities Regulation 29. The regulation provides that the AA rating system remains effective only as to deliveries until the end of September 1945 and that after that time AA ratings must be disregarded by suppliers.

Where a supplier receives a purchase order for delivery before Oct. 1, but is unable to schedule it for delivery until after Sept. 30, he must treat it as an unrated order under Paragraph (C) (2) of PR 29, the interpretation says. Suppliers, of course, must follow the requirements of PR 1 in accepting and scheduling AA rated orders for delivery before Oct. 1.

The same rules apply to treatment of authorized controlled material orders under Paragraph (D) of PR 29. This paragraph states that CMP and all regulations and directions under it, except inventory restrictions, will automatically expire on Oct. 1 and that until the end of September, deliveries of controlled materials will continue to be regulated by CMP alone and not by ratings. However, an order for controlled materials rated AAA, MM or CC, calling for delivery before Oct. 1, is to be treated as an authorized controlled material order, PR 29 states. On orders other than controlled material orders during the period until the end of September, the MM rating is equivalent to AA-1 and the CC rating is equivalent to AA-2.

CIO Considers Purchase Of Government Housing Project

Milwaukee

• • • Purchase of the government-owned model village of Greendale, near here, is under consideration by the Milwaukee County CIO council, the council has indicated. If the transaction is concluded the CIO might expand the village's 637 living units to 6000, with rental of a portion to the union members on a low rent basis. The balance would be offered for rental to the public.

How to master your cast-iron welding jobs

It's here! Not just another electrode, but the greatest contribution to the welding of cast iron — P&H "Harcast"! Over three years in the making, this new electrode brings amazing results — in easier welding . . . in better welds . . . in time saving. And it's available now for all your cast iron welding.

You'll like "Harcast"! The easy way it handles . . . the smooth weld deposits in all positions. No longer will you have the old troubles of weld cracks, poor penetration, excess porosity and pulling away at the fusion zone. "Harcast" ends all this — makes your cast iron welding simple and sure. Try it and see the difference!

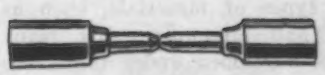
"HARCAST" GIVES YOU—

AC OR DC WELDING

"Harcast" works equally well on either AC or DC. Now, whatever your machine — whatever the cast iron you have to weld . . . it can be done easily and with better results.

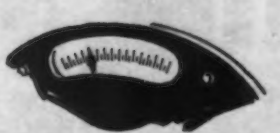
ALL POSITION WELDING

Downhand, vertical or overhead. "Harcast" is an all position electrode — makes your welding of cast iron easier.



GREATER TENSILE STRENGTH

Sound, dense welds with a tensile strength of 60,000 lbs. p.s.i. — approximately twice that of a good grade of cast iron.

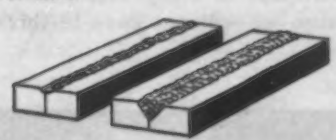


LOW AMPERE WELDING

"Harcast" was developed for low amperage welding to minimize dilution at the fusion zone, improve machining qualities.

WELDING STEEL TO CAST IRON

A feature that doubles the usefulness of "Harcast." It fuses well with mild or medium carbon steels for joining to cast iron.



SINGLE OR MULTIPLE PASS WELDING

Everything was considered in the development of "Harcast." That's why it is easy to use for single or multiple pass work.

WRITE TODAY FOR TEST SAMPLE OF P&H "HARCAST"

There's an electrode for every requirement in the complete P&H line. P&H welding electrodes are available in all sizes and types for fabricating — repair-welding — for rebuilding and hard-surfacing to provide unusual resistance to wear, impact and abrasion. Let P&H Field Engineers help you with your welding problems.

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A COMPLETE ARC WELDING SERVICE • WRITE FOR BULLETIN B7-3

P&H WELDING ELECTRODES

HARNISCHFEGER CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Ideas on the "Lost Art" of Small-Lot Production

By D. M. PATTISON
Sales Manager,
Warner & Swasey Co., Cleveland

o o o

• • • **As the war production** program grew in volume and quickened in pace, there was an inevitable and rapid trend toward quantity methods of production. Units that once went through the shop in lots of 500, began to go through in lots of 5000, 50,000 or 100,000. Methods of training and of supervision were altered to fit these new circumstances.

Repetitive operations on identical parts led to the use of special purpose automatic or semiautomatic machine tools, which both speeded output and reduced cost. In fact, because of the amazing increase in repetitive operations as the war program went on, general purpose machine tools which are flexible, were actually in many cases used of necessity as production machines; with set-ups remaining fixed day after day, and skill required of the operator no greater than would be required to run an automatic.

As we enter the transition period from war to peace, much is being said to the effect that many of production lessons learned through our wartime experience will be carried over into our peacetime economy. Certainly, greater accuracy will be expected throughout the entire metalworking field. There will be a broader use of various types of materials, such as plastics and aluminum, and many shortcuts developed under the stress of war will remain standard practice.

It is doubtful whether the automatic or semiautomatic special purpose machine will continue to hold the emphasis which it has held in war production days in many shops, simply because we will not have in this country, postwar, as large scale repetitive machining operations in unique industries as has been the case in connection with the war production program.

This assumption is not founded upon any doubt as to the advantages of automatic or semiautomatic machines for straight line or large quantity production. Neither is it based on any lack of faith in the overall volume of postwar production in the United States. Certainly the total amount of metal to be machined will be substantially higher than was the case before the war. This guess is predicated purely on human behavior and perhaps the most clear cut example may be found in the field of residential housing.

It is a well known fact that identical prefabricated houses can be manufactured and erected at a cost substantially below that of individually built homes, and in the past years various companies have experimented in this direction. In practically every case, these companies found that although remarkable savings could be effected by the application of the principle of mass production to home building, sales were limited for the simple reason that no two people wanted homes exactly alike. The human equation was still a predominant factor.

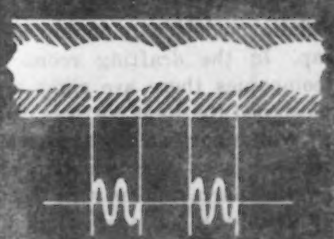
Let's think about this principle of individual taste as it applies to other products. If the people of the United States were buying nothing but the most economical form of highway transportation, we would have only one type of automobile in the country. But a man does not want an auto exactly like his neighbor's. He wants one with different features, painted a different color, with different trim and different gadgets. The only reason we do not have hundreds of different automobile companies in this country is because of a basic fact that automobiles must be built on a quantity production basis in order to bring them within reach of the ordinary person's pocketbook.

This diversity in public buying tastes is the very foundation of our competitive system of free enterprise. If everything in the United States were to be engineered purely from the standpoint of standardization and economy, the final result would be a system surprisingly close to that which Germany had under Hitler. It is one thing to work for Uncle Sam

o o o

ADAPTABLE: *In the photo at left, a Heavy Duty Turret Lathe is provided with a fixed setup of special tooling for machining Cylinder Tubes for military aircraft. Above, the same model turret lathe, equipped with a permanent setup of universal chucking tools, is readily adaptable to handle a large variety of jobs in small lots.*

...when it has to be watertight



Schematic cross section diagram of a seam weld. Interrupted current is generally used and produces a succession of overlapping spot welds. Electronic timers control the sequence of a typical setting: 2 cycles weld time and 2 cycles off time. Current values slightly higher than used for single spots are required due to the shunting of the adjacent weld.

FAST Higgins landing craft must use distilled water in the cooling of their power plants. It is essential that the distillation unit be both sturdy and splash-proof.

In fabricating this unit, Higgins Industries, Inc. uses *seam welding*. The Sciaky welder above is speeding the production of distiller cabinets. A single sheet of 24 gauge Monel metal is formed, then welded with a single longitudinal lap joint near the corner. The result is a strong, waterproof joint, produced with speeds up to 78" per minute. No special skill is required of the operator.

We can help you design your product to take advantage of this modern fabricating process. A variety of special wheels, mandrels and jigs can be adapted to your problem. A new booklet describing our 180 KVA series machines, including general information and tooling data is yours for the asking. Write for bulletin 113-A.

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Offices in New York, Washington, Cleveland, Detroit, Los Angeles
Representatives in principal cities. Plants in London and Paris

ELECTRIC RESISTANCE WELDING EQUIPMENT

SCIAKY

R-S gas-fired Furnace, twin-chamber pan type, capacity 27,000 lbs. per hour. Maximum temperature: 1500°F. Each chamber 5 feet wide and 36 feet long.

Plan now to operate R-S Continuous Furnaces for post-war production.

R-S Furnaces of Distinction

FURNACE DIVISION
R-S PRODUCTS CORPORATION

4524 Germantown Avenue • Philadelphia 44, Penna.

BUY WAR BONDS

making standardized war material; it's quite another to work for 130,000 different people with varying tastes and preferences.

This means that the average manufacturer, retooling for the future, must be, to use the old expression, "shifty on his feet." With the exception of certain industries in which large-scale production of fixed models is essential to operation, day-to-day flexibility will be imperative. Lots in quantities of 500, 5000, or 50,000 will be the exception. As in prewar, lots may be coming through in quantities such as 350 or 175, or even 50 pieces. Design may be changed over night because of swift developments in competition, and the ability to make an immediate changeover will be a definite advantage in getting business. Just as cancellations were a big worry in war production, changes in specifications may be a big worry tomorrow.

Today many companies, especially those engaged in the manufacture of durable consumer goods, are going to put on the market models of their products very similar to those which they put out before the war. They will do this because the demand is urgent, because they have the dies, jigs and fixtures on hand, and because it is the simplest method of satisfying the immediate market.

But these models will merely be a stop-gap. In the drafting rooms of these companies there are right now being designed the Real postwar models that will supersede the immediate postwar models. Under these circumstances, the parts maker who relies entirely upon automatic or semiautomatic special purpose machines will be left at the post. He will not be able to move fast enough.

It would seem then, only the part of prudence for the manufacturer to plan his machine tool setup with a broad allowance for flexibility. This means that he should have in his shop a sufficient margin of general purpose machines to give him the mobility required to meet swift changes in specifications and in type of work.

In this regard, it has been suggested that the manufacturer would do well to consider the possibility of supplementing his purchases of new general purpose machine tools with purchases from the government-owned war-built surplus of machine tools which are now becoming available in increasing quantities. Some of the general purpose machine tools owned

How to get your money's worth in used machine tools

UNQUESTIONABLY, there are many real bargains on the Government Machine Tool Surplus Lists. And you can be sure of getting them if you remember that there are three variables involved: price, accuracy and life.

A machine tool, at its original price, offers a specific degree of accuracy over a definite life expectancy.

The question, then, on any used machine tool, comes down to this: "Can I get the accuracy my product requires long enough to justify my investment?"

CONSULT THE MANUFACTURER

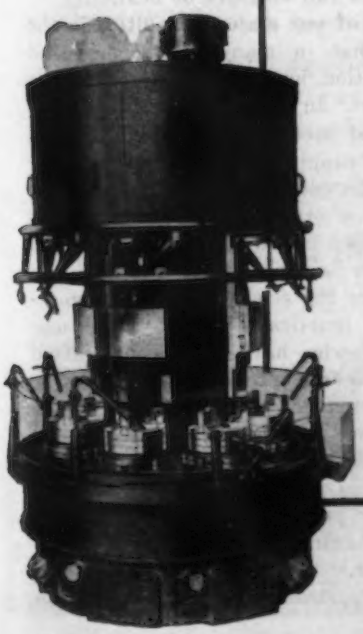
Where can you get the answer? The manufacturer of that machine is your best source. Knowing the history of that machine, he will determine how much it will cost, above your purchase price, to put it to work in your shop. He will tell you how long you can expect to get the accuracy you want.

If that machine tool has outlived its usefulness to the extent that it will not give you the accuracy you want over a profitable period, you can depend on the manufacturer to advise against purchase. For, remember, even on a used machine tool, his reputation is still at stake. Your dissatisfaction over a bad investment would hurt him even more than you.

CONSULT BULLARD

Specifically, on used Bullard Machine Tools, write to us for information by machine number, outlining your intended use.

The Bullard Company, Bridgeport 2, Connecticut.



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BULLARD CREATES ***NEW METHODS*** TO MAKE MACHINES DO MORE

This is NOT Just Another Screw"

Cuts Fastening Time ½ Half!

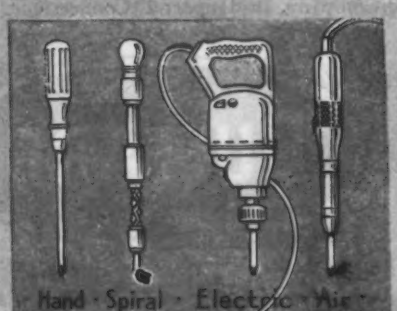
...it is a HOLTITE-Phillips Recessed Head Screw...a cost-cutting, time-saving fastening that has been universally adopted for well-planned production which demands efficiency economy and speed with safety

y headed fastening can be furnished with this cut-cost recess

ecause the driver or bit does not from the scientifically designed ss in heads of HOLTITE-Phillips ws and Bolts, power drivers can safely used to cut your fastening an average of 50% or more. By enting work spoilage and in- s to operatives, previously caused the gouging of slipping drivers, n hands and women workers can ly and proficiently power or l drive these modern fastenings. hen confronted by fastening blems, submit them to our Research b." A specially trained staff of perienced engineers will gladly y your difficulties and make mmendations for the most effi- t solution.

Power drivers replace slow hand driving even on finished parts.

Screw holds on end of driver or bit to permit one hand driving, leaving other hand free to hold work.



Any type of hand or power driver can be easily and safely used.

CONTINENTAL SCREW CO New Bedford.

by the government and used for war production have, it is true, taken a tough beating and may require reconditioning or perhaps rebuilding. Others, however, may be in sufficiently good condition to be put to work on the factory floor immediately.

A practical procedure would be for the manufacturer considering the purchase of a government-owned machine tool to get in touch with the original builder of that machine and check its age, size and type, electrical specifications and tooling. Already there have been numerous cases where a manufacturer has purchased a surplus machine only to discover upon its arrival that it did not fit his needs or additional items of equipment raised the cost beyond that of a new machine.

Another question of the same sort arises in connection with general purpose machine tools used in the war production program as production rather than general purpose machines. Many of these machines were bought with the full complement of standard tools which, however, were not used for the war production job these machines performed. It is now time that the manufacturer checked up on this complement of standard tools and made sure that they are on hand and in good order.

Similarly, the manufacturer who bought a general purpose machine, such as a turret lathe, for war production purposes but did not at that time buy the complement of standard tools which went with the machine, should now make sure that he secures from the original builder the standard tools which provide that machine with its full measure of flexibility.

One of our major difficulties is the fact that in many plants small-lot production has become practically a lost art. In the old days, any well-satisfied metalworking plant had an ample supply of all-around machinists who could do a variety of work on a variety of machines and who could set up the machines for the work to be done.

Under the stress of the war emergency, practically all of these machinsts who have not been drafted have become foremen, supervisors or superintendents. Their places at the machines have been taken by people who, for the most part, have been taught to perform only one operation on one particular machine, without even knowing how to set up their own machine.

Under straight line quantity pro-

1919

Butt welding steel couplings for oil casing, a method developed by A. O. Smith that utilized SMITHway patented paper-coated electrodes and produced welds with tensile strengths at a new high of approximately 60,000 p.s.i.

26 YEARS SEPARATE THESE PICTURES

. . . and 70,000 p. s. i. pressure requirements

1945

X-ray quality welding of high-tensile, alloy steel torpedo air flasks, with special electrodes developed by A. O. Smith—an achievement that produces welds with tensile strengths in excess of 130,000 p.s.i. after heat treatment.

The Proof Is in Production

The mastery of preparation and welding techniques that made A. O. Smith developments as revolutionary in 1919 as they are in 1945 is born of welding research that never ends . . . research that goes on in A. O. Smith laboratories and production research in A. O. Smith plants as well.

Every day more than 320,000 SMITHway electrodes are used on every type of product—large and small complex and simple, mild steel, high-tensile, and stainless.

Farsighted management everywhere is studying how welding, the modern production tool, improves quality, cuts cost, simplifies production.

Mild Steel . . . High Tensile . . . Stainless Steel

WELDING ELECTRODES

made by welders . . . for welders

A Complete Line Soon SMITHway A. C. Welders

Ready for delivery soon, the expanded line of A. C. Welders includes three new models of 150-, 200-, and 250-ampere capacity, in addition to the 300-, 400-, and 500-ampere heavy-duty models. Write for complete specifications and prices.

SMITHway Certified WELDING ELECTRODES

A. O. SMITH Corporation

COKE OVEN EQUIPMENT

QUENCHING CARS AND LOCOMOTIVES

All Atlas Coke Oven Equipment is of heavy-duty construction permitting the peak operating conditions required in today's stepped-up production schedules. As a result of years of experience, Atlas is able to design and build equipment, to meet the requirements of each particular coke plant. Detailed information available on request.

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Ore Transfer Cars
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duction this method works, as evidenced by our nation's war production accomplishments. But this system certainly will not function under an economy in which small-lot production again comes into play. In war production, a supervisor who was a good machinist and setup man could handle the setups on eight machines and supervise the operators of those machines. He could do this because the lots were so large that setup was infrequent and each operator required merely a rudimentary understanding of a single repetitive job.

But suppose those eight machines are now called upon to produce a multiplicity of small job lots which require one setup after another on each machine. One supervisor cannot possibly handle all of the setups and in the meantime, the operators would be idle. The answer, of course, is that the operators must learn to handle their own setups.

Just as companies inaugurated training schools geared to quantity production when the war began, it would now seem practical for companies to inaugurate schools to train operators for the requirements of small-lot production. The returning veteran should be given particular consideration in this situation. If such schools were established, it might be possible to bring returning veterans into those schools, thereby facilitating the veteran re-employment program. Certainly it would seem essential to reestablish the apprentice training system.

In any event, American industry can no longer assume that its operations will be founded upon quantity output of repetitive items. Not only employee training, but machine tool alinement and purchases, factory controls, and cost methods, should contain an allowance for the factor of small quantity production plus the capacity for rapid changeover.

Ford Waives Plant Option

Detroit

• • • **Ford Motor Co.** has waived its option and purchase rights to the land and buildings of Willow Run. The company lease will terminate Sept. 20, and the option would have run for 90 days thereafter.

Ford retains the right of first refusal for six months after Sept. 20, giving it the opportunity to obtain the plant by meeting the best offer received by the government for the plant or items of equipment during that period.

A Future Design!
The accumulation of new technical data, along with the great developments in the aluminum and magnesium fields, promise many new things for a post-war world. Among these is the building on a quantity production basis of motor launches in beautiful, intriguing and useful designs. Light alloys provide both sales appeal and great operating economy. If your product uses—or can use—aluminum or magnesium, the Bohn organization would be glad to discuss their many advantages with you.
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GENERAL OFFICES—LAFAYETTE BLDG. • DETROIT 26, MICH.
Designers and Fabricators
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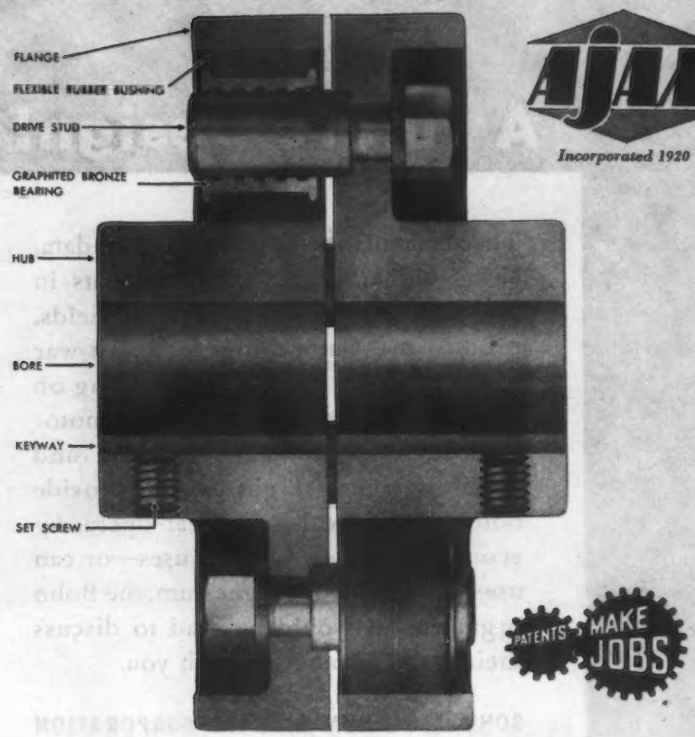

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Ajax Flexible Couplings protect direct connected machines from unavoidable misalignment. They require no lubrication. They are quiet running — no backlash, no noise. They provide free end-float which permits electric machinery to find its magnetic center. They operate satisfactorily in abrasive-laden air.

They are built in a wide range of sizes and capacities with standard couplings *made of forged steel or cast semi-steel.*

For special requirements flanges can be machined from aluminum, bronze or other metals, and can be plated with chrome, silver or cadmium for protection against adverse atmospheric conditions. Thousands of cadmium-plated Ajax Couplings are running on U. S. Navy equipment throughout the world.

Ajax Couplings can easily be made integral with brake drums, pulleys, fly wheels, etc.

Write for new catalog giving complete data.

AJAX FLEXIBLE COUPLING CO. INC.

WESTFIELD, N. Y.

New SAE Board Will Supervise Technical Committee Activities

New York

• • • **Appointment of an SAE technical board of 24 automotive engineers to coordinate and supervise all technical committee activities of the Society of Automotive Engineers has been announced by SAE President J. M. Crawford.**

L. R. Buckendale

L. R. Buckendale, engineering vice-president of the Timken-Detroit Axle Co., Detroit, has been named chairman of the board, which already has begun the work of converting the SAE war engineering program to peacetime service of industry and of government. Additionally, the board will direct the development of a new cooperative engineering program designed to implement the request of Lt. Gen. Levin H. Campbell, U. S. Army Chief of Ordnance, for broadening and intensifying war-time "functional teamwork" of SAE and Ordnance engineers to keep American motorized military equipment superior to that of potential enemies.

First meeting of the board, recently held, was concerned with plans for gradual transformation of the SAE war engineering program, involving more than 1400 essential engineering projects and the cooperation of several thousand SAE members, into a coordinated peace time program of technical committee activities which will render engineering advisory service to industry and government.

Members of the new board, in addition to Chairman Buckendale, are: B. B. Bachman, engineering vice-president, the Autocar Co., Ardmore, Pa.; D. P. Barnard, associate research director, Standard Oil Co. (Indiana), Whiting, Ind.; Rex B. Beisel, general manager, Chance Vought Aircraft Div., United Aircraft Corp., Stratford, Conn.; A. T. Colwell, vice-president, Thompson Products, Inc., Cleveland, Ohio; and Roy E. Cole, engineering vice-president, the Studebaker Corp., South Bend, Ind.

Also, R. M. Hazen, chief engineer, Allison Div., General Motors Corp., Indianapolis, Ind.; J. H. Hunt, direc-

LOW COST Rust Prevention!

USE HARPER NON-FERROUS AND STAINLESS FASTENINGS

Rust is the Great Destroyer. Every year it causes damage of "war debt" proportions.

Fortunately, the cost of preventing rust and corrosion through the use of Harper Everlasting Fastenings is low. Of course, the first cost of a bronze bolt or a stainless screw is more than a comparable fastening made of common steel. Yet the difference in price is small, particularly when considered in relation to the total cost of a machine, instrument or other fastened assembly. Everlasting fastenings add longer service life to your product...and the ability to perform under tough conditions. Such qualities provide a big advantage over competition.

4360 ITEMS IN STOCK

Harper is known as "Headquarters for Non-Ferrous and Stainless Fastenings" . . . carries large and complete stocks of 4360 different items and is continually adding others . . . maintains large stocks of metals in bars, rods, wire, sheet and other basic forms from which special fastenings can be quickly made. Write for 1945 Catalog.

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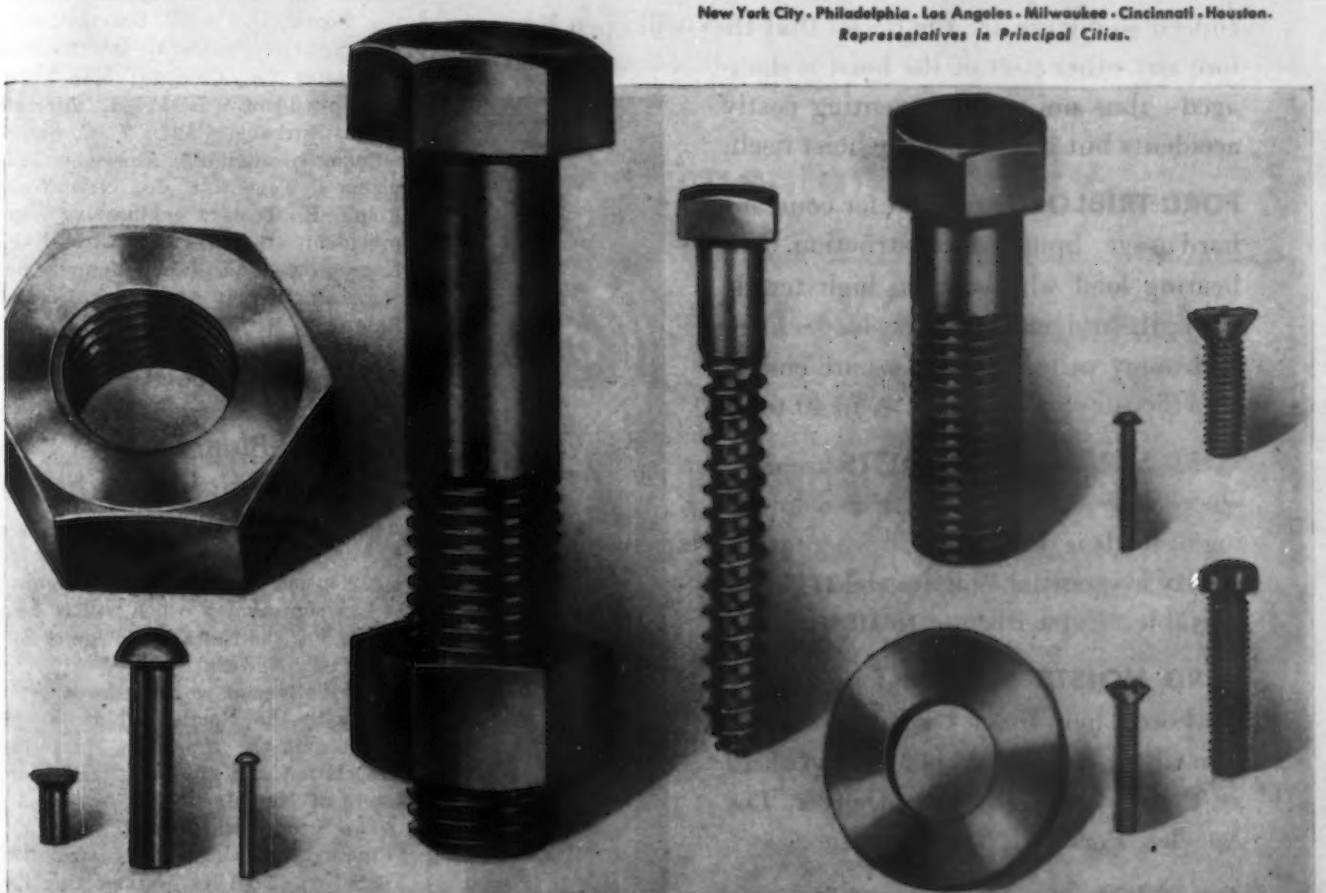

HARPER

EVERLASTING FASTENINGS

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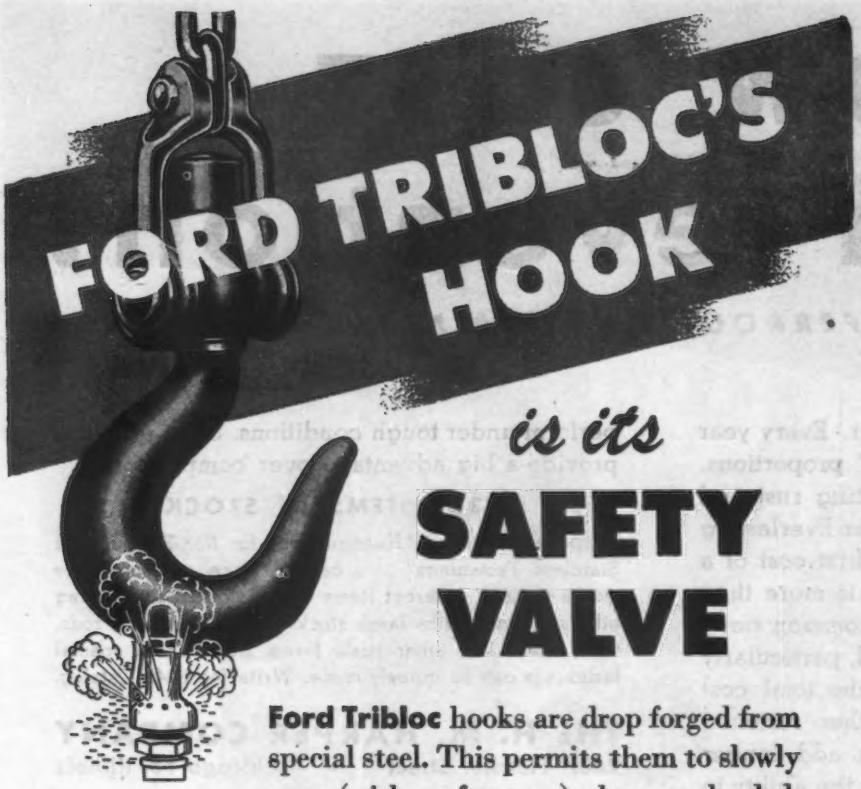


is its

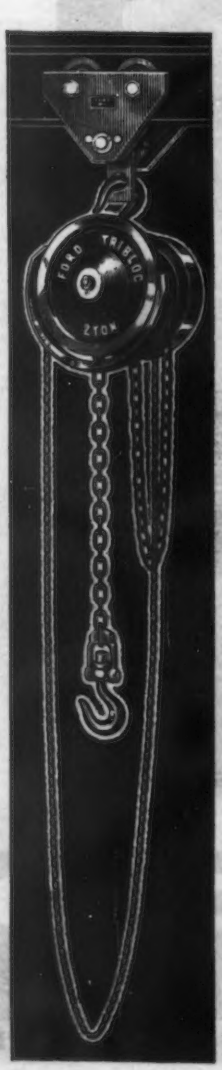
SAFETY VALVE

Ford Tribloc hooks are drop forged from special steel. This permits them to slowly open (without fracture) when overloaded. Indeed so ductile are the hooks that they will open before any other part of the hoist is damaged—thus not only preventing costly accidents but protecting the hoist itself.

FORD TRIBLOCS are ideal for constant hard usage. Spur gear construction, ball-bearing load wheels, both high tensile strength and elasticity in load chain, and many other features assure enduring efficiency. Capacities: ¼ to 40 tons.

FORD SCREW GEAR HOISTS are used where smoothness in lifting and lowering of loads is desirable and where portability is essential. Lightweight: highly portable. Capacities: ½ to 10 tons.

FORD HOISTS are manufactured by the Ford Chain Block Division of American Chain & Cable, Bridgeport. Offices at Philadelphia, Chicago, Denver, Los Angeles, Portland, San Francisco.



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AMERICAN CHAIN & CABLE
BRIDGEPORT

tor, New Devices Section, General Motors Corp., Detroit; R. D. Kelly, superintendent of development, United Air Lines, Inc., Chicago; G. W. Laurie, automotive transportation manager, the Atlantic Refining Co., Philadelphia; and William Littlewood, engineering vice-president, American Airlines, Inc., Jackson Heights, L. I., N. Y.

Also, Erle Martin, engineering manager, Hamilton Standard Propellers Div., United Aircraft Corp., East Hartford, Conn.; R. H. McCarroll, executive engineer, Ford Motor Co., Dearborn, Mich.; Arthur Nutt, director of aircraft engineering, Packard Motor Car Co., Toledo and Detroit; C. R. Paton, director of automotive engineering, Packard Motor Car Co., Toledo; and L. S. Pfost, chief engineer, Tractor Div., the Massey-Harris Co., Racine, Wis.

Also, Delmar G. Roos, engineering vice-president, Willys-Overland Motors, Inc., Toledo; C. G. A. Rosen, research director, Caterpillar Tractor Co., Peoria, Ill.; A. W. Scarratt, engineering vice-president, International Harvester Co., Chicago; Mac Short, vice-president, Lockheed Aircraft Corp., Burbank, Calif.; T. C. Smith, automotive engineer, American Telephone & Telegraph Co., New York; Relph R. Teetor, engineering vice-president, the Perfect Circle Co., Hagerstown, Ind.; R. W. Young, chief engineer, Wright Aeronautical Corp., Paterson, N. J.; and J. C. Zeder, chairman of the engineering board, Chrysler Corp., Detroit.

Courses Planned On Materials Distribution

Newark, N. J.

• • • "Engineering for Improved Distribution" is the general subject of two conferences which will be held this fall at the Newark College of Engineering, Newark, N. J.

The College is working in cooperation with the Northern New Jersey Chapter of the American Marketing Association and the Industrial Marketers of New Jersey.

The group which will study the "Finding and Using of Distribution Facts" will hold its first meeting the evening of Oct. 2 under the direction of Everett H. Cargen, Jr., of the Wright Aeronautical Corp.

On Oct. 3, Herbert Mercready of Mercready and Co., an industrial sales promotion company of Newark, will open a series of discussions on "Promotion and Selling for Improved Distribution."

STRIPPED FOR ~~ACTION~~ Industrial Service

Brake Shoe's Experimental Foundry

V-J DAY marked the end of war projects at Brake Shoe's full-sized Experimental Foundry in Mahwah, N. J. The film of wartime restrictions has been removed, and we are ready to tackle the stiffest research and development problems on iron castings for any industrial purpose.

What the Experimental Foundry Is

A pilot plant that is more than a pilot plant, Brake Shoe's Experimental Foundry is fully equipped to produce and heat-treat castings up to 2,000 pounds. It contains induction furnaces, horizontal and vertical centrifugal casting machines, and the latest equipment for solving foundry production problems. It is actually just one unit in a research group that includes sand testing laboratory, creep test laboratory, engineering and mechanical laboratories in addition to standard chemical and metallurgical instruments.

Do You Have a Problem that concerns

- low or high tensile strength
- heat resistant irons
- close tolerance castings
- pressure castings
- corrosion resistant irons
- dies or molds
- special-purpose alloys

If you have, we invite you to outline the problem or the condition that is to be met, and submit it to our research engineers.

Brake Shoe

BRAKE SHOE AND CASTINGS DIVISION
230 PARK AVE., NEW YORK 17, N. Y.

SPECIALISTS IN THE PRODUCTION OF ABSCO-MEEHANITE CASTINGS

4230

New Baker ARTICULATED Fork Truck cuts aisle requirements

DESIGNED PRIMARILY FOR EFFICIENT WAREHOUSE OPERATION

A basically new design* involving a new method of steering by "articulating" the frame, permits swinging the load to line it up in position without lining up the truck itself. Thus this truck requires about two feet less space for placing loads at right angles to aisles. It needs less clearance on turns, and speeds carloading or any other handling operation where loads must be lined up or positioned in congested areas.

Specific advantages of this truck are:

1. Works in narrower aisles.
2. Turns in a smaller radius.
3. Spots loads quicker and easier.
4. Control units are more accessible.
5. Simpler Steering design cuts maintenance.
6. Permits mechanization of handling where hand trucks were necessary because of space limitations.

Field tests in both warehouse and production operation have proved the many advantages of this new truck. For complete specifications request Bulletin 1330.

*Licensed under Stevenson Patent No. 2,284,237.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
2175 West 25th Street • Cleveland, Ohio
In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

Cost and Research Open New Fields To Magnesium Products

By WISER BROWN
Vice-President and General Manager, American Magnesium Corp., Cleveland

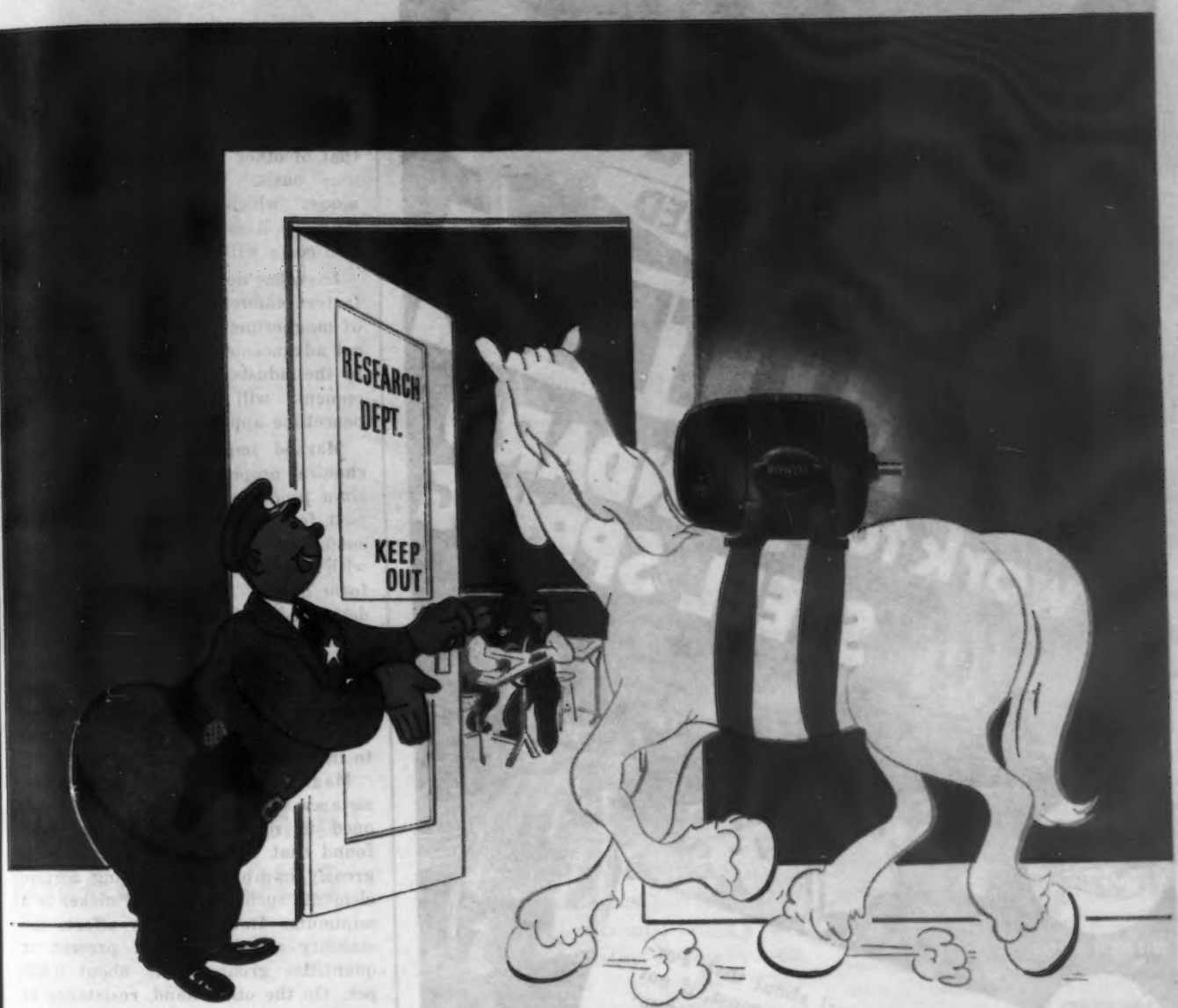
Cleveland

• • • **Before Pearl Harbor** the nation was producing magnesium at a rate slightly over 6 million lb per year. This quantity, while more than sufficient for the prewar needs, was inadequate to meet the demands of any expanded aircraft program and, as a result, magnesium was one of the first materials to go under priority. So private industry began to expand its productive facilities and government plants were constructed to help combat this shortage of magnesium. By 1940 production had doubled and had grown by 1941 to approximately 33 million lb per year. Production soared still higher, until 36 million lb of magnesium were being produced *every month.*

So far as postwar utilization of this expanded production is concerned, there are several factors that indicate its likelihood. One, of course, is the greatly increased number of workers who now have the know how of working with the metal. The knowledge they have acquired in handling and fabricating the metal should influence the amount of magnesium products to appear after the war in useful commercial articles.

Working with magnesium has also brought about a better understanding of magnesium's inflammability. For a number of years magnesium was considered a dangerous metal with which to work. The increased use of the metal in war work and the introduction of safe handling techniques have dispelled most fire worries.

Always important, in the development of any market, is the question of price. Magnesium ingot prices have followed a downward trend as markets and production facilities increased. From $5 a lb in 1915 the ingot price fell to 27¢ a lb in 1939, and on Jan. 1, 1943, was reduced to 20½¢ a lb. On a weight for weight basis, magnesium is more expensive than the other common commercial metals. On a price per unit of volume basis, however, magnesium has an edge over some of its competitors because of its light weight. Definite strides have also been taken during the past few



Mister, now's the time to figure on *Horsepower by Howell*

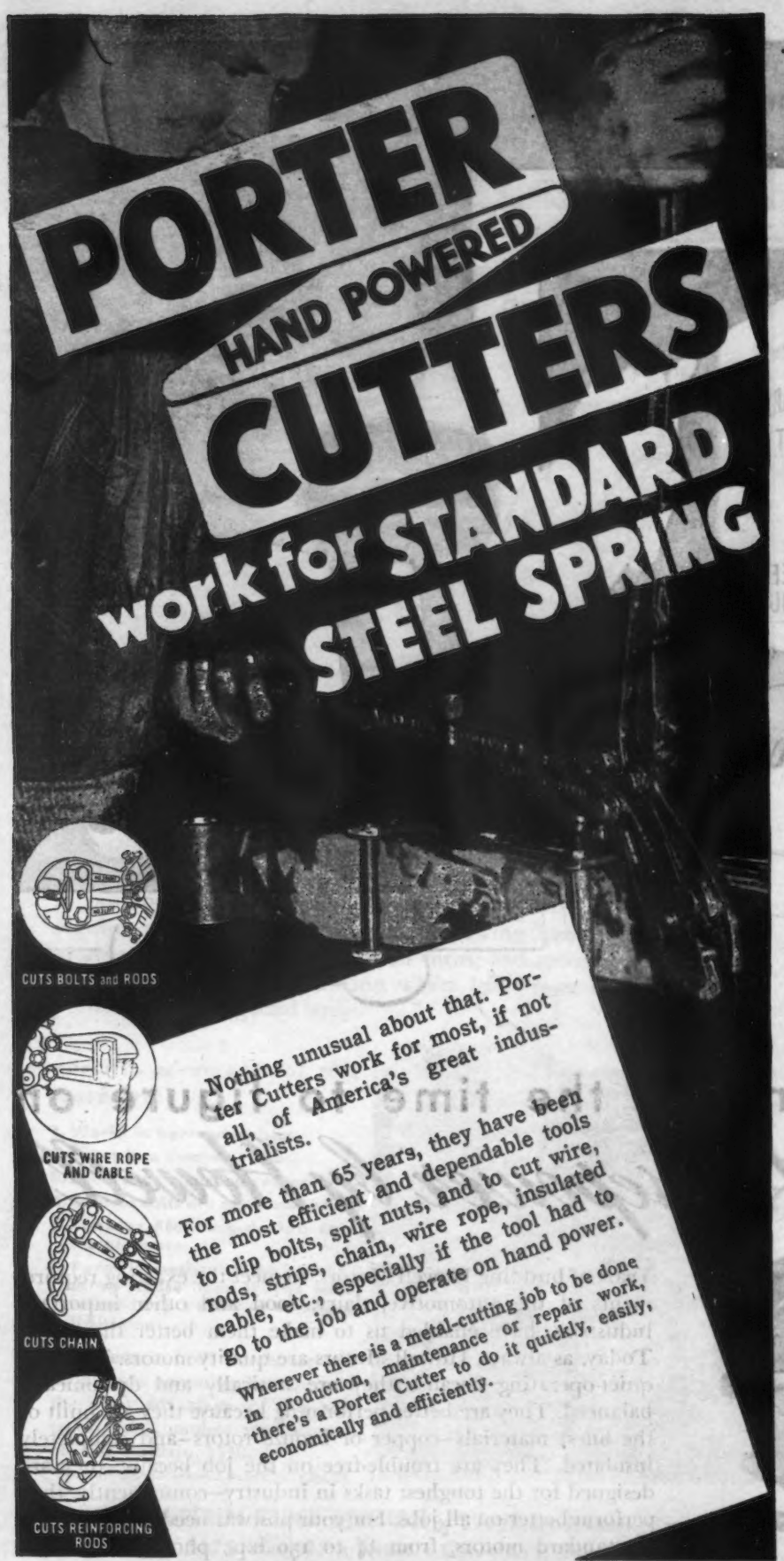
The Howell Protected Type Motor, shown, gives complete protection against dripping liquids, metal chips and other falling particles. Completely streamlined—utilizing non-breakable steel frame—malleable or steel base—cast iron end plates and cast iron, weatherproof terminal box are standard construction features. Special horizontal and vertical mountings are available. *Available in sizes 5 H.P. and smaller. Other sizes and types available up to 150 H.P.*

Years of building Howell Motors, to meet the exacting requirements of the automotive, dairy, food and other important industries, have enabled us to make them better than ever. Today, as always, Howell Motors are quality-motors. They are quiet-operating because they are statically and dynamically balanced. They are better performing because they are built of the finest materials—copper or bronze rotors—and completely insulated. They are trouble-free on the job because they are designed for the toughest tasks in industry—consequently, they perform better on all jobs. For your postwar need in specialized or standard motors, from ¼ to 150 h.p., phone the nearest Howell Representative today.

HOWELL ELECTRIC MOTORS COMPANY

HOWELL, MICHIGAN

Manufacturers of Quality Motors Since 1915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Nothing unusual about that. Porter Cutters work for most, if not all, of America's great industrialists.
For more than 65 years, they have been the most efficient and dependable tools to clip bolts, split nuts, and to cut wire, rods, strips, chain, wire rope, insulated cable, etc., especially if the tool had to go to the job and operate on hand power.
Wherever there is a metal-cutting job to be done in production, maintenance or repair work, there's a Porter Cutter to do it quickly, easily, economically and efficiently.

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PORTER HKP CUTTERS

years in reducing fabrication costs. In some instances the price of magnesium products is now comparable to that of other metals on an equal volume basis. With the newer techniques which war production has brought, it is expected that fabrication costs will be further reduced.

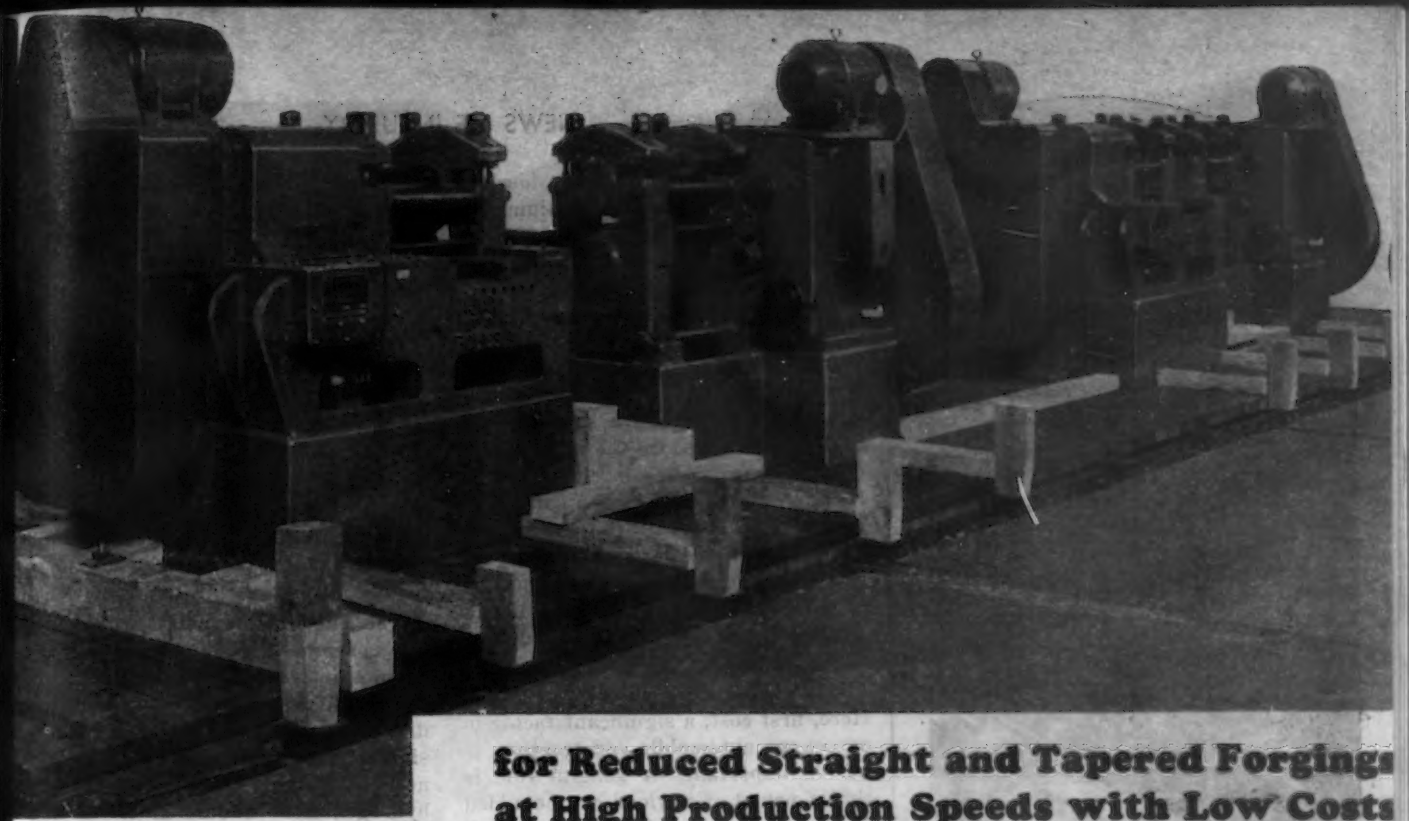
Last, but not least of the important factors influencing the postwar use of magnesium products is the technical advancement that has been made by the industry. Many of these developments will be useful in civilian peacetime applications.

Marked improvement in the mechanical properties of various magnesium products has been made in the past few years. Permanent mold and sand castings can now be produced with excellent strength and high uniform quality. New alloys have been developed that can be extruded faster and with higher mechanical properties. New methods have been developed for forming magnesium sheet, such as new die heating practices, and a great deal of work is underway to improve forging practices.

Magnesium alloys with superior resistance to corrosion have been developed in recent years. It has been found that resistance to corrosion is greatly improved by keeping certain elements such as iron and nickel to a minimum. Iron adversely affects the stability of alloys when present in quantities greater than about 0.005 pct. On the other hand, resistance to corrosion is improved if a small amount of manganese is added as an alloying constituent. A number of chemical treatments and improved methods of surface protection have been developed which also greatly improve resistance to corrosion when used as a base for paint coatings. In addition, the development of new and improved joining and fabricating techniques will certainly influence the increased use of magnesium in peacetime products.

Among the industrial markets for postwar magnesium products, transportation should be one of the largest. Their use in rolling stock should improve operating efficiency and result in increased payloads.

The greatest single user of magnesium has always been the aircraft industry. Before the war 90 pct of the magnesium produced in this country went into aircraft in one form or another much of it in engine construction. The tremendous quantity of this metal that is now being used for aircraft will undoubtedly decline when plane production decreases. It



AJAX

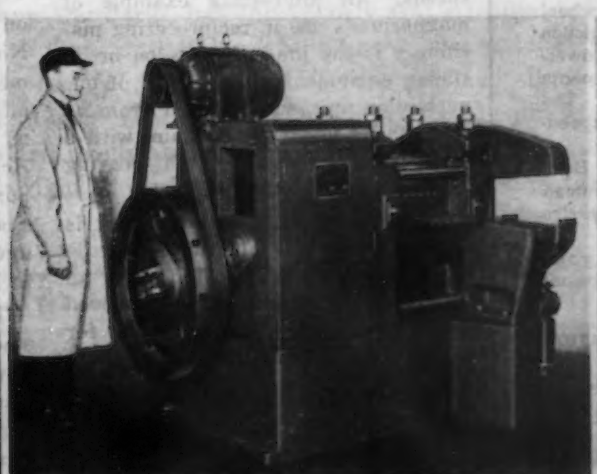
WIDE ADJUSTMENT FORGING ROLLS

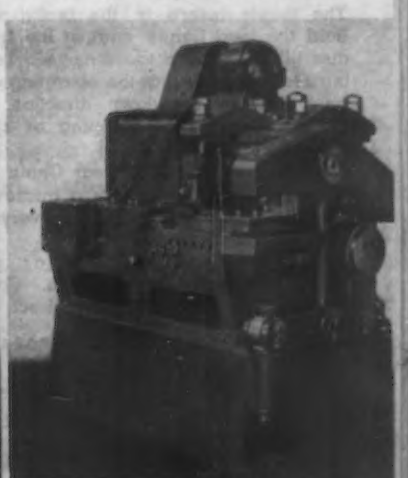
for Reduced Straight and Tapered Forgings at High Production Speeds with Low Costs

Many forgings with reduced shanks or of tapered design, such as barge spikes, files, tapered Spring Leaves, Brake Shoe Keys, Coil Spring ends, Carpenter's Chisels, Agricultural Forks, etc., can be forged most advantageously on the small No. 0 Ajax Forging Roll. In addition to taper rolling, attachments for these rolls such as the Horizontal Front Press, for side squeezing between roll passes, and the Vertical Side Press for shearing, trimming, straightening and bending, greatly increase their scope of forging production.

With the six larger sizes of Ajax Forging Rolls the entire field of gap rolling which can be handled manually is covered and such parts as automobile rear axle drive shafts, automobile gear shift levers, automobile brake pedal levers, railroad car brake levers, tapered tubing and many others can be forged quickly and efficiently. And the simplicity with which these rolls effect great reductions in cross sectional area makes them most valuable in blanking stock to desired sections for subsequent upsetting, press forging or drop forging.

Write for Catalog No. 91-A





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EUCLID BRANCH P. O. CLEVELAND 17, OHIO

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TO HOLD LOADS *Accurately* WITH SAFETY

The positive acting friction brake on the Reading Multiple Gear Chain Hoist makes possible accurate positioning of the work or load with complete safety.

The maple inserts in the brake wheel hold the load tightly against the friction disc till the load is to be moved. Lowering requires only that the operating chain be pulled in the down direction. The load lowers without slipping or speeding up.

Each Reading Multiple Gear Chain Hoist is so well built that it has a guaranteed overload capacity of 25% in every size from ¼ ton to 25 tons.

Investigate Reading Hoists for your materials handling problems. Consult your distributor or write us direct.

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CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

is felt, however, that a considerably greater amount of magnesium per plane will be used in the postwar era because of the advantages gained through weight saving. Some aircraft designers are of the opinion that magnesium can also be used to advantage in aircraft wing construction. They claim that a thicker, welded magnesium skin with a smooth, flush surface would reduce the drag caused by the irregularities in riveted skins, thereby improving speed and efficiency. The trend of the aircraft industry after the war will definitely play a major role in the amount of magnesium products that will be used.

The outlook for magnesium in trucks and buses, is encouraging. Here, first cost, a significant factor in passenger automobile construction, is not so important. A general rule is that a pound of payload can be added for every pound of deadweight saved. There are also economies of operation. Less power is needed for stops and starts with the result that tires and gasoline are saved. It is expected that the metal can be used for the frames of mechanically operated doors, opening mechanisms, seat parts, ceiling braces, window guard rails, tire carriers, frame castings and numerous other applications. Magnesium should also find its way into such engine parts as crankcases, transmission cases and covers, oil pans and the like.

Reciprocating machinery, as used in the textile industry, is another market. Magnesium's light weight lowers operating costs, reduces vibration, and permits higher operating speeds. An interesting example of magnesium's use in reciprocating machinery is the knife frames on bread slicing equipment. The weight of one particular unit was reduced from 44 to 13 lb by using magnesium, with a corresponding reduction in bearing loads and vibration.

The field of portable equipment is also expected to provide a fertile market for magnesium. Whenever an article must be lifted or moved about, it offers a potential market for magnesium. The equipment used in foundries is a good example of this market. Magnesium pattern plates, foundry flasks, and core boxes were just reaching general acceptance when war uses took over. A magnesium core box or pattern plate is light and easy to handle. By reducing the weight of a core box, for instance, from 15 to 10 lb through the use of magnesium, one man was able to increase his output of cores from 100 to 120 a day. Magnesium offers several other advantages in foundry use. Plates are easy to shave down and the metal satisfactorily resists the wearing action of sand.

Typewriters, pneumatic tools, sewing machines, vacuum sweepers, welding equipment and unloading conveyors are other examples of the type of portable equipment that utilized the advantages of magnesium's light weight before the war. These and many more similar applications will help to expand the markets for magnesium after the war.

The chemical industry will doubtless consume large quantities of magnesium in various forms. Cylinders for solidifying caustic soda, and hydrofluoric apparatus made of magnesium have proved satisfactory. Magnesium shavings are used in the hydrogenation of oils, in the drying of oils and for the purification of certain gases. Its affinity for oxygen and nitrogen makes it an excellent deoxidizer and scavenger in nonferrous metallurgy. Addition of the pure metal helps to remove bismuth from lead and to cleanse tin-lead solder, brass, bronze, copper, nickel, nickel-silver, and Monel. Magnesium is also employed by certain chemical companies as a catalytic agent in the formation of complex organic chemical compounds.

RFC Negotiating Sale Of Aircraft Plants

Buffalo

• • • **Bell Aircraft Corp.** is carrying on negotiations for purchase of its Niagara Falls plant from the government. The RFC, in advertisements offering the plant "for sale or lease," as required by the Surplus Property Act, listed 32 permanent and six temporary buildings with a total floor space of 1,250,000 square feet. The agency placed investment in the plant at $22,000,000.

The Samuel Greenfield Co., Inc., smelters and refiners, has bid for the government-owned plant of 3700 square feet which it has been operating in conjunction with its own facilities at 31 Stone St.

The RFC also announced resale of the Chevrolet plant in East Delavan Ave. to General Motors Corp. for $2,550,000. The agency said the government's disbursements on the property exceeded $3,000,000.

Notes on
STEEL CASTINGS

What meets *Navy Standards* is

TOP GRADE . . . anywhere

Anything that meets Navy standards has top quality and stamina, believe us. That goes for steel castings as well as men, and PSF ought to know. We've turned out a vast tonnage of castings for marine purposes, of which the LST hub and cap shown is only one item. However, meeting high standards is something to which PSF's advanced foundry techniques, testing methods, and modern machining facilities are extremely well adapted. For quality work, correct to the most rigid "specs" in every detail, you can count on castings by PSF.

47 YEARS OF STEEL CASTING KNOWLEDGE

Pittsburgh STEEL FOUNDRY CORPORATION

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Peace Time Springs?

The quick acquisition of raw material is a *must* for reconversion.

We are fortunate in having an inventory which will permit us to furnish springs promptly from all sizes of Music Wire or Oil Tempered Wire and from many sizes of Phosphor Bronze or Stainless Steel.

We are ready and able to help you get going . . . *fast.*

Phone Holly 2211 or from Detroit dial Cherry 4419

AMERICAN SPRING OF HOLLY, INC.
HOLLY, MICHIGAN

Home Laundry Survey Shows Expanding Need For Diversified Lines

Chicago

• • • More than 25 pct of all home laundry equipment will be sold in ensembles for "out-of-basement" installation, a majority of appliance dealers believe, according to results of a survey released today by Fred C. Margolf, manager, Home Laundry Sales Div., Edison General Electric Appliance Co. He announced at the same time that Hotpoint washing machines were in limited manufacture again for the first time since 1942, and will be available to consumers in early 1946.

The survey brought answers from 2360 specialty appliance dealers, 1053 furniture stores, 816 hardware stores, 256 department stores, 86 auto accessory and 81 variety stores, as well as 495 "miscellaneous" dealers. The figures showed that 3006 were "downtown" locations, while 1190 dealers said they operated in neighborhood shopping centers.

In analyzing possible trends reflected in the survey, Margolf called attention to the figure showing that 79.2 pct of the dealers would sell automatic washers, noting that 46.6 pct had sold them previously. He said that all home laundry activities would benefit from the interest centered upon this new appliance. The increased percentage of dealers does not indicate a customer preference approaching the dealer percentage, he emphasized, pointing out that all of the dealers would sell conventional washers.

Commenting upon the answers to the opinion question indicating that more than 60 pct of the dealers look for 25 pct or more of the laundries to be designed for rooms adjacent to kitchens and otherwise "out-of-basement," he attributed much of this sentiment to increased interest in "complete" laundry ensembles of appliances. The figure showing that more than 60 pct of the dealers will sell metal cabinets, and more than 50 pct will sell tumbler clothes dryers, gives a line on the high percentage who will desire "complete" laundries, he said.

Mr. Margolf made a special point of the trend toward merchandising washers with a single size tub. Dealers will be able to carry a complete stock of washers with a fraction of the inventory formerly necessary where many tub-sizes made up a line of machines. Another merchandising benefit will be that they can carry adequate displays of "lesser known" appliances such as ironers and dryers. He expressed the opinion that ironers have suffered in sales volume in the past because few dealers displayed an adequate selection, and fewer merchandised them by demonstrations that would show customers the usefulness of the machines.

Construction Order Rescinded by Board

Washington

• • • Construction Order L-41 has been withdrawn effective Oct. 15, the Office of War Mobilization and Reconversion announced Sept. 18. OWMR also announced a six-point program to expedite expansion of the construction industry. The program was agreed upon after an agency meeting between OPA, WPB, OES and NHA:

1. Through interagency action, an active campaign to increase supply of scarce building materials. Price and wage increases may be granted in some cases to facilitate the program.

2. Inventory controls will be strengthened by WPB.

3. Price controls on building materials will be strengthened by OPA to counteract inflationary tendencies.

4. The government will also attempt to discourage unsound financing and mortgaging.

5. An advisory group consisting of real estate and construction men will be summoned to Washington to formulate the putting into effect of the program.

6. NHA in conjunction with the construction industry will jointly provide information for prospective home builders.

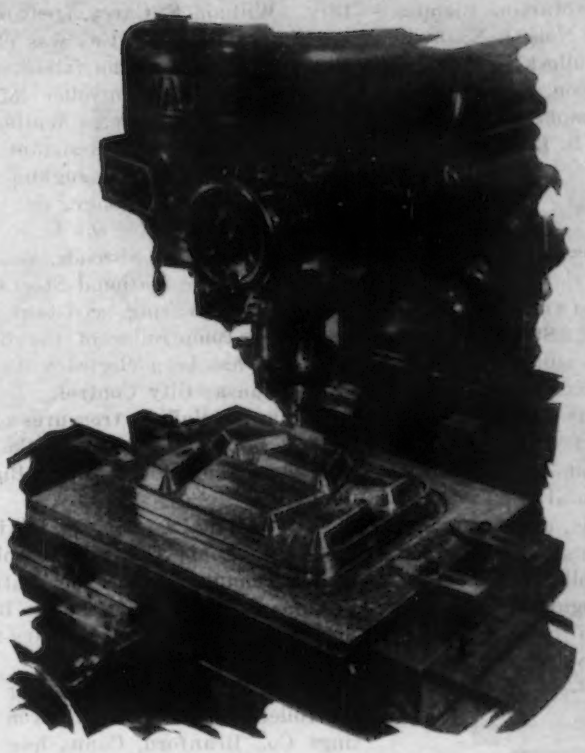
Incorporates Southern Science and Industry

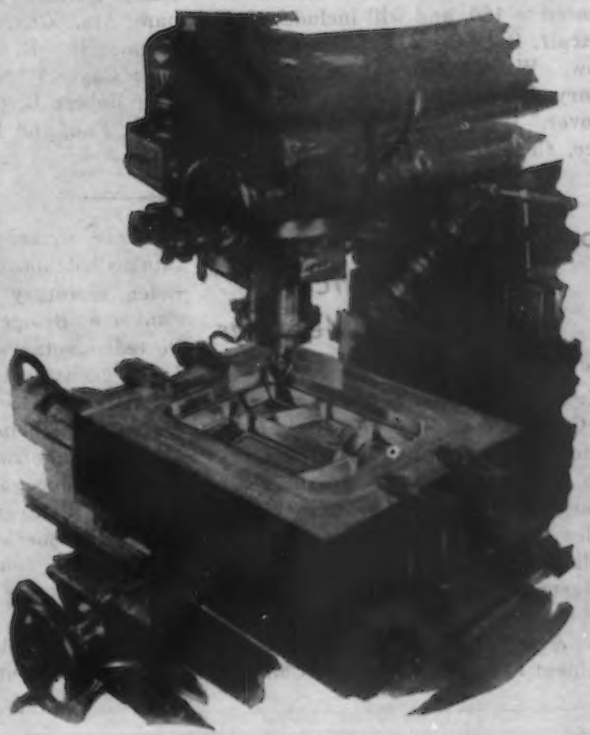
Birmingham, Ala.

• • • Southern Assn. of Science and Industry, a five-year-old organization, has been incorporated. The association, headed by Lloyd C. Bird, Richmond, Va., plans to further the economic development of the South. Business, industrial, educational and scientific leaders will aid the organization, Mr. Bird said, and added that a budget of $500,000 will be the financial goal.

Improvements in the education field, conservation and development of the South's raw materials and

How would you handle this Job in your Shop?





Photos — Courtesy Eclipse Molded Products Company

1001

Molds for plastics pose some tough milling problems occasionally. Here's a tray mold — that could have been difficult, but it was completed on a Milwaukee Rotary Head Milling Machine with typical speed, economy, and accuracy.

Read this job report —

TRAY MOLD

CAVITY SIZE — width, 12 inches, length, 15½ inches, depth, 1½ inches.

Time required for milling both mold halves complete — 219 hours.

All form cutters milled to correct size and shape on the Milwaukee Rotary Head Milling Machine.

Check these advantages of the Milwaukee Rotary Head Milling Machine and how you can benefit from them in your own shop:

DIRECT . . . mills mold cavities in a single set-up without the aid of templets or models.

ACCURATE . . . chances for error are eliminated because there is no change in set-up. Exact control of all combinations of cutting movements—possible only with this machine—transmits mathematical precision to the work.

FAST . . . initial job preparation and set-up time is reduced to the minimum. Accurate performance of the machine saves operator's time and rapid production of intricate molds and dies is the result.

Write for Bulletin No. 1002C and complete information.

BUILDERS OF MILWAUKEE ROTARY HEAD MILLING MACHINE • MIDGETMILL • SPEEDMILL • FACE MILL GRINDER • AUTOMETRIC JIG BORER • CENTER SCOPE.

Kearney & Trecker

Products

CORPORATION

Milwaukee 14, Wisconsin

Subsidiary of Kearney & Trecker Corporation

natural resources and their manufacture into finished products are among the objects of the program mapped out at a meeting of the group held here.

Members of the board will be increased to 180, and will include: Z. P. Metcalf, Raleigh, N. C.; Marcellus H. Stow, Washington, D. C.; R. S. Henry, Washington D. C.; Charles O. Hoover, Houston, Tex.; Homer M. Pace, Charleston, S. C.; J. E. Mills, Hartsville, S. C.; W. F. Hand, State College, Miss.; I. A. Willis, Siloam Springs, Ark.; E. Emmet Reid, Baltimore, Md.; D. J. Weddell, Athens, Ga.; Stewart J. Lloyd, University, Ala.; Thomas W. Martin, Birmingham, Ala.; Charles Nelson, Nashville, Tenn.; H. E. Bullock, Lexington, Ky.; Caye A. Nelson, Baton Rouge, La.; Robert B. Campbell, Gulf Hammock, Fla., and L. B. Roberts, Monticello, Ark.

Controllers Institute Elects New Officers At Local Meetings

New York

K. B. Coates, assistant treasurer of the Great Lakes Steel Corp., has been elected president of the Detroit Control of the Controllers Institute of America, George H. Maslen, comptroller of the American Chain & Cable Co., elected president of the Bridgeport Control; and John Pugsley, controller of the Tennessee Coal, Iron & Railroad Company, elected president of the Birmingham Control.

At the annual meeting of the institute's Chattanooga Control, Cornelius Bolen, secretary and treasurer of the Converse Bridge & Steel Co., was elected secretary-treasurer. Charles L. Jones, assistant treasurer of the Alan Wood Steel Co., was made secretary of the Philadelphia Control of the national organization. A similar post with the Chicago local was accorded Joseph B. Lanterman, assistant comptroller of American Steel Foundries. J. B. Pollard, controller and assistant treasurer of the Ingalls Iron Works & Subsidiaries, Birmingham, Ala., was named secretary-treasurer of the Birmingham Control.

Six steel company executives were elected to office by the members of the Pittsburgh Control: R. C. Markle, assistant controller of the U. S. Steel Corp. of Delaware, was chosen secretary. William F. Carey, treasurer of the Edgewater Steel Co., was elected a director, as were the following: J. Herbert Carson, controller of the Pittsburgh Steel Co.; Walter H. Dupka, controller and assistant treasurer of the Jones & Laughlin Steel Corp.; George W. Rooney, vice-president and controller of the U. S. Steel Corp., and Paul E. Shroads, assistant treasurer of the National Steel Corp.

Robert G. Waring, assistant treasurer and comptroller of the Butler Mfg. Co., has been elected a director of the Kansas City Control.

L. Clayton Vallier, treasurer of the Buffalo Foundry & Machine Co., has been elected president of the Buffalo Control.

At the annual meeting of the institute's St. Louis Control, Joseph C. Huehn, comptroller of the National Bearing Div. of the American Brake Shoe Co., was elected secretary-treasurer.

Frank V. Bigelow, treasurer and controller of the Malleable Iron Fittings Co., Branford, Conn., has been elected a director of the Bridgeport Control. James V. Britt, assistant secretary and assistant treasurer of the Unicast Corp., and E. L. Stewart, treasurer of the Sandusky Foundry & Machinery Co., Sandusky, Ohio, were elected directors of the Toledo Control.

Sackett R. Duryea, assistant to the treasurer of the Wyman-Gordon Co., Worcester, is a new director of the institute's Boston Control.

At other local elections held by the Controllers' organization, Keith J. Harris, secretary and assistant treasurer of Ross-Meehan Foundries, was named a director of the Chattanooga Control; W. R. Hummel, comptroller of the Wyant & Cannon Foundry Co., Muskegon, was named to the board of the Western Michigan Control, and R. E. Smith, Jr., auditor of the Mesta Machine Co., was elected a director of the Pittsburgh Control.

BELLEVUE
Controlled
Atmosphere
FURNACES

EVERY Bellevue furnace is designed and built for a specific job. Hundreds of furnaces and repeat orders in scores of plants is evidence enough that you can have complete confidence in Bellevue engineers to solve your heat treating problems. Send for complete details.

BELLEVUE INDUSTRIAL FURNACE CO.
2974 BELLEVUE AVENUE DETROIT, MICH.

Offer Furnaces, Ovens And Foundry Equipment

New York

• • • **Surplus foundry** equipment; heat treating and melting furnaces; and baking and drying ovens are offered for sale by the Surplus Property Division of RFC at 70 Pine Street, New York, on list No. N. Y. 184.

Above: *Plate for an annealing cover being formed in a sectional hydraulic press.* Right: *The completed annealing cover.*

GENERAL AMERICAN KNOWS YOUR NEEDS . . .

For years the Plate and Welding Division of General American Transportation Corporation — located at Sharon, Pa. — has supplied many of the nation's largest iron and steel manufacturers with a long list of products such as:

Accumulators—Acid Tanks—Annealing Covers—Bins —Coke and Benzol Plant Equipment—Galvanizing Pots—Gas Mains—Oil Storage Tanks—Pickling Tanks —Pressure Vessels—Stacks—Stand Pipes—Tin Pots— Towers—Welded Pipe, large dia.—Welded or riveted plate fabrication, shop built-up or field-erected.

General American *knows your needs,* and has all the facilities to serve you well. Large shops and laboratories, X-ray, heat-treating and stress-relieving furnaces, a thoroughly-equipped field erection department, excellent rail connections — plus an organization that is able and eager to do big jobs in minimum time and at *prices that get the business.*

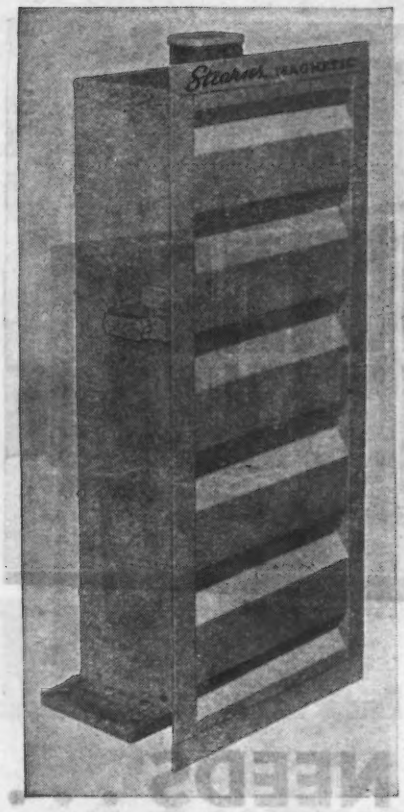
Write for any specific facts you may need. *Address:*

GENERAL AMERICAN
TRANSPORTATION CORPORATION

PLATE AND WELDING DIVISION

General Sales Offices: 513c Graybar Bldg., New York 17, N. Y.
Works: Sharon, Pennsylvania
Sales Offices: Chicago, Sharon, Louisville, Cleveland, Pittsburgh, St. Louis, Salt Lake City, San Francisco, Tampa, Washington, D. C.

Stearns
AIR DUCT MAGNET



If you are bothered with tramp iron or metallic refuse in air blown material such as cotton, wool, shoddy, etc., investigate the merits of this thoroughly tried Stearns Air Duct Magnet. An efficient, strong, automatic piece of magnetic equipment designed by a pioneer magnetic engineering firm. Write for details.

IF IT'S MAGNETIC
WE MAKE IT
PULLEYS · BRAKES
DRUMS · CLUTCHES
SEPARATORS · FILTERS
ORE CONCENTRATORS
SEPARATION OR LIFTING MAGNETS
Stearns MAGNETIC MANUFACTURING CO.
635 So. 28th St., Milwaukee 4, Wis.

Canadian Power Is Defended by Alcan

Arvida, Quebec

• • • "Quebec is a pioneer in electric power and aluminum development, and those who claim that the Shipshaw Power Development is bringing competition to the American aluminum plants in the Pacific Northwest and that the American plants should be subsidized have things exactly backwards, they have the cart before the horse," said Mr. McNeely DuBose, vice-president of Aluminum Co. of Canada, Ltd., at a meeting of the Saguenay Industrial Development Assn., held at Arvida, Quebec, where the Shipshaw Power Development is located. He was discussing recent articles in the United States press suggesting that the American Pacific Northwest plants should be subsidized or their power costs lowered to enable them to "combat" competition from Quebec.

Mr. DuBose explained that in his opinion the competition was the other way around, saying that almost half a century ago Quebec was far ahead of the Pacific Northwest in power and aluminum production.

Contrary to contentions expressed in Washington that American funds built Shipshaw, Mr. DuBose stated that none of the power developments in the Province of Quebec had cost the Canadian or the United States governments anything. He said that if anyone has a right to complain about competition as result of Government financing policy it is Quebec and not the Pacific Northwest.

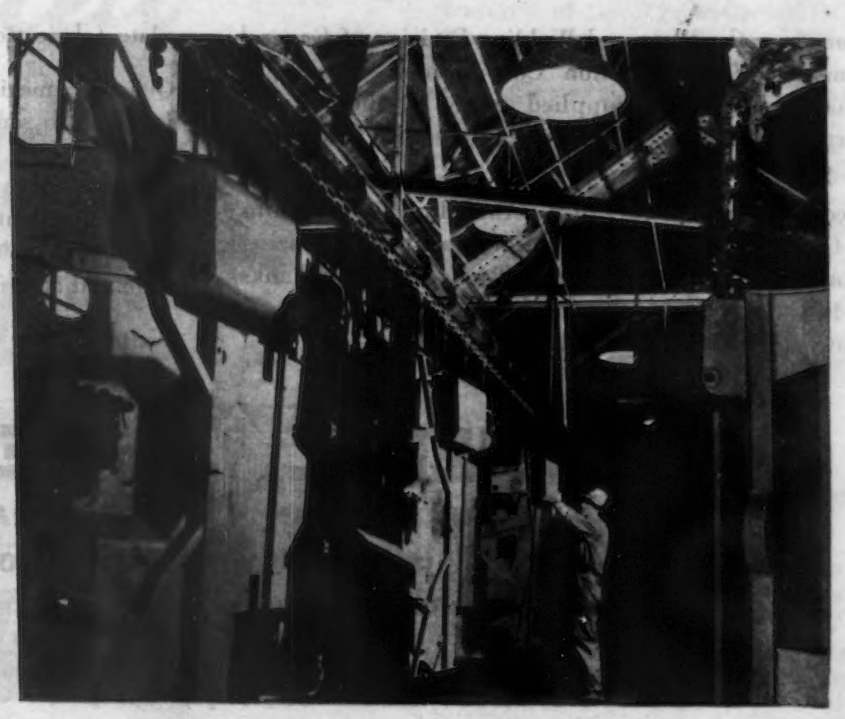
Sees Large Order Backlog

Buffalo

• • • The Sterling Engine Co. has enough orders on hand to maintain operations at the current rate for six months, according to Addison F. Vars, president. Employment of 500 workers approximates the 1941 figure and compares with the wartime peak of 1500.

With a $1,500,000 backlog of orders and $1,000,000 more in immediate prospect, the company's principal business is from railroads which are replacing gasoline engines in switching locomotives with Sterling Viking Diesels. The company also received an order for engines for the $15,000,000 Great Lakes pipeline from Texas to the Lakes.

CIVILIAN JEEPS: *Workers at American Central Mfg. Corp., Connersville, Ind., have completed the last of 492,429 jeep bodies built during the last 2½ years for Willys-Overland and Ford. Production is now underway on bodies for the jeep's peacetime counterpart, Willys-Overland's new CJ-2-A. Initial contracts call for several thousand a month.*



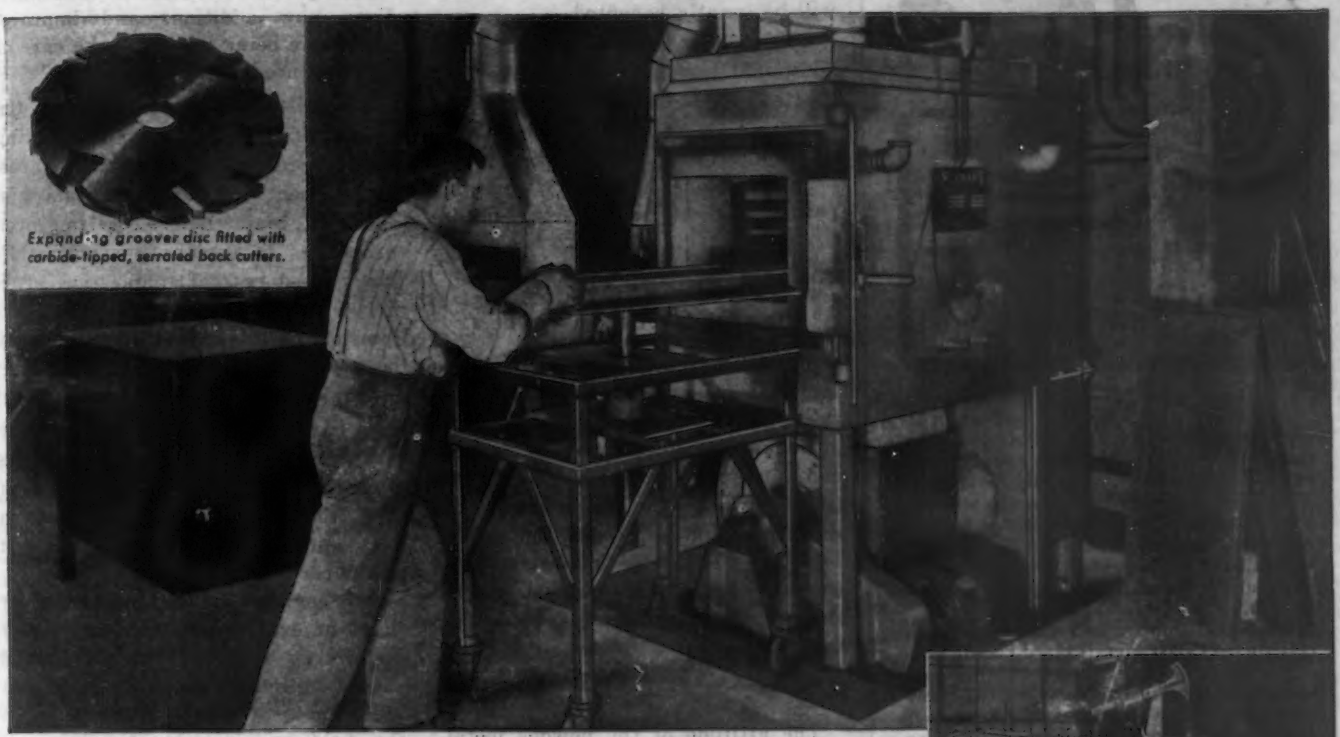
STEWART

THE BEST INDUSTRIAL FURNACES MADE

No. 59 OF A SERIES of Typical Installations

For HEAT TREATING CUTTER HEADS and KNIVES

at the Wisconsin Knife Works, Beloit, Wis.



Expand-ing groover disc fitted with carbide-tipped, serrated back cutters.

Workman loading Stewart Tray-type Air Recirculating Furnace at Wisconsin Knife Works, with knives fabricated from molybdenum steel. The Tray-type unit was selected due to the variance in the sizes and shapes of the pieces to be heat-treated. Stewart also builds Basket, Box, and Car-type Recirculating Furnaces.

Loading Stewart Oven Furnace in the process of welding carbide-tips to cutters.

Because of the work Badger Knives and Cutter Heads are called upon to perform, they must be subjected to proven scientific methods of heat-treating by experienced operators using the latest type of controlled furnaces.

To insure the required degree of hardness tempering of Badger tools to free them from interior strains, the Wisconsin Knife Works installed three Stewart Furnaces in their Heat-Treating Department. Two Stewart Oven Furnaces are employed for hardening and for welding carbide-tips to knives, and one Stewart Recirculating Furnace for tempering.

Badger Cutter Heads and Knives are used in fabricating airplane stock, gasoline tanks, motor wedges, truck bodies, plywood, railroad ties, sash and doors, cabinets, and other items.

Cutter heads and knives produced in the shop from raw stock are brought into the Heat-Treating Department for heat-treating. Parts are heat-treated, quenched, tested, and sand blasted, after which they are returned to the shop to be finished.

These Stewart Furnaces at the Wisconsin Knife Works are typical of the dependable industrial heat-treating units we have built in the past and will continue to build today and tomorrow—both large types to meet the specified requirements of manufacturers all over the continent, as well as standard types.

Cutter head, complete with milled-to-pattern bits. Note the fine pin points of pattern on cutting edge which necessitates proper heat-treating to maintain cutting size and contour.

STEWART INDUSTRIAL FURNACE DIVISION of CHICAGO FLEXIBLE SHAFT CO.

Main Office: 5600 W. Roosevelt Road, Chicago 50, Ill. — Canada Factory: (FLEXIBLE SHAFT CO., LTD.) 321 Weston Rd., So., Toronto 9

A letter, wire or 'phone call will promptly bring you information and details on STEWART furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a STEWART engineer will be glad to call and discuss your heat-treating problems with you.

Powder Metallurgy Precision Parts

(CONTINUED FROM PAGE 54)

search departments in ordnance plants and in many large industrial concerns are also working on metal powder problems. When the results of all this research are adjusted to the practical experience of powder metallurgy manufacturers, the industry will be greatly benefited.

The industry continually runs into additional problems which have been created by actual production runs. These are investigated in its laboratories and often result in new slants on production. The very practical nature of these problems will assure even more tangible future benefits to the industry.

Stainless Steel From Powders

There are other specific problems that are waiting to be solved after the war. The solution of the problem of making stainless steel by powder metallurgy, for instance will, if realized, mark a new milestone in the industry. In any event, the use of corrosion resistant materials will come in the future as a natural result of the demand to reduce high maintenance costs caused by the corrosion and rust of parts and assemblies.

The attitude of the powder metallurgy industry towards the future stems out of its past. Twenty-five years ago most of the products of powder metallurgy were limited to a few specialty products.

Today these same items are still being made but in greatly increased volume. They have also been improved and adjusted for applications in other fields.

For a long time many of the large automobile manufacturers have been making bearings, bushings, motor brushes, and other parts from powder metallurgy as standard items of equipment. They have produced these parts by the millions. Many other new parts, which have been covered in this article are being made as standard production products of powder metallurgy today.

There are now 25 of the larger companies manufacturing powder metallurgy parts and at least 30 sources for metal powders. All of these manufacturers have installed expensive equipment and some have started sizable research laboratories. This probably represents a total investment of more than $15,000,000. Other installations in allied industries would probably increase this investment by several millions of dollars. Even now additions and improvements are being made to take care of postwar needs.

This discussion has indicated the possible fields of expansion resulting from an increased variety of shapes, development of new materials and constant maintenance of improved properties in various powder metallurgy products. The question often arises as to whether substantial expansion in productive facilities may be expected after the war.

In attempting to answer this question, careful appraisal has to be made of the limitations of the field and its potential market. Snap judgment will, therefore, probably lead to a very optimistic outlook. Whereas it seems certain that companies now actively engaged in the production of parts of every description in powder metallurgy will continue to expand their facilities, it seems probable that the number of manufacturers now in the field will not greatly increase. Some of the reasons for this condition may be summarized as follows: A great deal of research and development would be required in order to come up to the standard already established in the industry.

Even if this investment is made or if the knowledge is available through skilled personnel or advisory service, pilot plant production will always have to be resorted to in order to translate laboratory developments into actual production before it is possible to offer the product to the market. Powder metallurgy know-how cannot be bought in the open market, and those who have it, gained it by actual experience in the plants which will keep them busy in their anticipated expansion program. This, of course, is not unique to the field of powder metallurgy, but is true of any art which has been highly developed in a number of large and small organizations, but about which little is known to the general engineering public.

SHOT BLAST
WEAR SHOT

SHOT BLAST quickly wears out the ordinary protective cover liners of sand blast machines. In one Michigan foundry, for example, liner life was only 95 hours. Then Coast Metals Hard-Facing was applied, and now liners average 760 hours! Another foundry that faces liner plates with Coast Metals saves $15.25 every 33 days, and eliminates 10 replacements a month.

No wonder more and more plants are relying on Coast Metals Hard-Facing! Because of its resistance to wear, abrasion, shock and heat, it stretches the life of new or worn parts several times. Application is simple—by arc or acetylene welding. Use it on surfaces, edges, points to keep equipment on the job and save shut-downs.

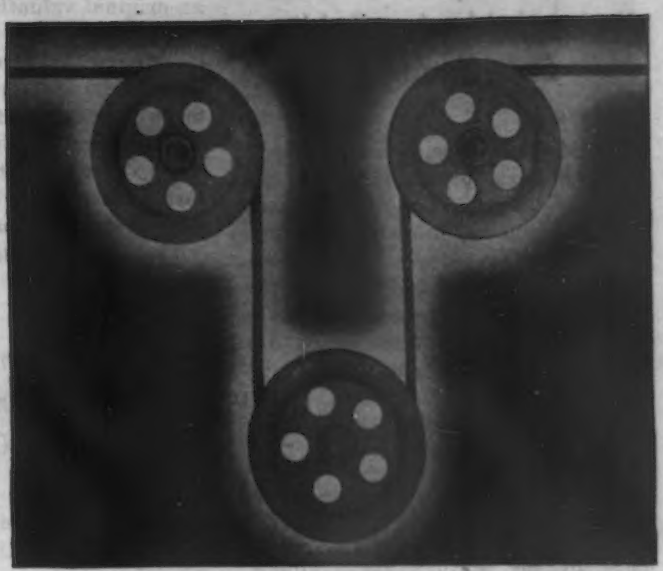
Write for details in pamplet "Your Best Protection Against Wear."

COAST METALS, INC.
Plant and General Offices:
1232 Camden Ave., S.W. Canton 6, Ohio
Executive Offices:
2 West 45th Street, New York 19, N. Y.

COAST
METALS
hard-facing weld rods
MAKE YOUR
EQUIPMENT
LAST LONGER

Recommended for these extra-tough jobs!

MACWHYTE PREformed WIRE ROPE



Macwhyte PREformed Wire Rope gives excellent service on the following installations:

EXCAVATING:

Load Lines on all types of portable excavating machinery such as:
Shovels
Clamshell Cranes
Pull Stroke Shovels
Draglines
Backfillers
Pile Drivers
Scrapers—Scraper Loaders

MINING:

Hoist, Slope, or Incline Ropes
Mining machine ropes
Non-spinning ropes for shaft sinking and shaft hoists

DRILLING:

Rotary oil well drilling lines

QUARRYING:

Derrick Main Falls
Whip Ropes
Slings

LOGGING:

Choker Ropes
Haulback Lines
Main Lines
Skidding Lines
Receding Lines
Loading Lines

GENERAL:

All Lang Lay Ropes
All 18 x 7 Kilindo Non-rotating Ropes
Elevator Ropes
Industrial Ropes

Send for booklet 43-85 "Wire Rope Conservation Bulletins" illustrating and describing many factors affecting wire rope service.

The correct rope for your equipment

Twenty years of service has proved that because it is more flexible, Macwhyte PREformed Wire Rope gives superior service on equipment requiring a great amount of bending over sheaves, particularly at high speeds. Macwhyte PREformed also stands up better under heavy loading and continuous operation.

Because it lasts longer, Macwhyte PREformed costs less in the long run.

HERE'S WHY Macwhyte PREformed lasts longer. Each wire and strand is PREformed to the exact helical shape it assumes in the finished rope. This reduces internal stresses, greatly increases flexibility.

Macwhyte PREformed is Internally Lubricated

Every wire in every strand of Macwhyte PREformed Wire Rope is coated with Macwhyte Internal Lubricant to improve the sliding action of the wires as they move in bending around sheaves and drums.

MACWHYTE COMPANY

Wire Rope Manufacturers

FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie-Rods
MACWHYTE Stainless Steel Wire Rope
MACWHYTE Monel Metal Wire Rope

MACHINE TOOLS

. . . News and Market Activities

General Purpose Tools Available for Public Sale Under RFC Rule

Washington

• • • Standard-type, general-purpose machine tools priced in accordance with the Clayton formula, are available for general, unrestricted public sale under procedures recently announced by RFC. The Clayton formula established depreciation rates on machine tools up to three years. Depreciation on tools not in the purchasers' plants varies from 15 pct before one month to 54.8 pct for three years or more. (THE IRON AGE, July 20, 1944, p. 114.)

Although all government-owned machine tools except a small reserve set aside by the services are available, some will be sold under options held by lessees and others will be sold to lessees in possession under SPB Regulation No. 6. It has been determined that the balance is sufficient to supply the entire requirements of private industry as to every type and kind of standard-type general-purpose machine tool.

Small business, veterans, State and local governments are assured of getting the tools they need in view of the plentiful supply, disposal officials say.

Now that such machine tools may be sold before they are formally declared surplus, the disposal agency need only have a statement from the owning agency that the tools are surplus and in the process of being so declared in order to proceed with the sale.

Upon receipt of such notice the disposal agency concerned may negotiate sales to any interested purchaser giving preference, in the order listed, to: (1) Agencies of the Federal Government, (2) agencies of states or their subdivisions, (3) small businesses employing less than 500 employees, (4) small lot purchasers for own use, (5) large lot purchasers for own use, and (6) dealers.

A national advertising program is being undertaken to inform the general public of surplus tool sales. It will be sufficiently widespread to satisfy the statutory requirements for wide public notice.

Where sales of surplus tools involve an original valuation of $1 million or more, approval of the Attorney will be required as heretofore.

Small business needs will continue to be met to the fullest possible extent through the Smaller War Plants Corp., it was stated, and every effort will continue to be made to assure prompt disposal.

The previous delays which the new system is expected to minimize or eliminate altogether, involved preparation of detailed declaration information required by SPB Regulation 1, the 30-day waiting period for federal and state agencies to assert their claims, legal interpretation that required advertising particular lots of tools and the provisions of the law intended to give small business a better competitive advantage.

° ° °

Advance Demand For Government Machine Tools Cancels Show

Chicago

• • • Buyers already have spoken for virtually all of the 1200 standard general purpose machine tools at the government-owned Studebaker aircraft engine plant here, causing cancellation of a public sales-inspection scheduled for Oct. 1-12.

Indications that surplus property regulations now are interpreted to permit sale of tools to the public without advertisement is contained in an announcement by M. O. Hoel, acting RFC manager for the Chicago region, that "former restrictions have been cancelled and practically all machine tools at the Studebaker plant in Chicago have already been sold to expedite reconversion."

Other equipment at the plant, including heat-treating furnaces, plating equipment, anodizing equipment, dichromate equipment, impregnating equipment for magnesium castings, conveyor equipment, paint spray equipment and drying ovens, still is available, and RFC will consider prompt offers.

The disposal agency is soliciting buyers to make their machine tool requirements known by letter in triplicate, rather than waiting for public sales announcements of tools at given plants. In the Chicago district, largest concentrations of surplus tools are located at the government-owned Chrysler Corp. Dodge-Chicago aircraft engine plant, which is estimated to contain over 7000 machine tools, and the government-owned Buick aircraft-engine plant which originally had about 10,000 pieces of production equipment. Sale was negotiated with Buick for about $800,000 worth of this equipment this summer, however.

The government has uder consideration offers for the purchase of the Studebaker plant, with Western Electric prominently mentioned as a possible purchaser.

The mammoth Dodge-Chicago plant was advertised for sale or lease last week, and this fact, it is believed, will speed disposal of the tooling. K. T. Keller, president of Chrysler Corp., was reported to have conferred with Mayor Edward J. Kelly of Chicago, on disposition of the plant, indicating that Chrysler was interested.

•

Foreign Inquiries Good

Cincinnati

• • • Local machinery builders are moving smoothly into peacetime production, scheduling bookings right behind the finish of war production. While strictly war orders are all but completed, some manufacturers indicate tag ends are being tied up. New business, especially from foreign sources, continues to be good. Bookings from widely scattered European sources are reported with inquiry from South America also being received. Domestic business is satisfactory but much of it is delayed by consumers' own conversion problems.

Bolt Simplification Issued

Washington

• • • Effective Oct. 1, the proposed revision of Simplified Practice Recommendation R169-37, Machine, Carriage and Lag Bolts, has been approved for promulgation, the Division of Simplified Practice, Bureau of Standards, has announced. The recommendation will be identified as R169-45.

LOOK AT THESE FEATURES!

- Carbide Tipped for Performance
- Develops Finer Finishes
- Faster, Vibrationless Cutting
- Prompt Delivery

IT'S THE ANGLE FOR SUPER SLOT CUTTING

SUPER'S BI-AXIAL RAKE SLOTTING CUTTERS were developed to give maximum strength to the cutting edge which receives the initial impact at the start of each chip.

Another outstanding advantage of this SUPER CUTTER is that the cutting force of one-half of the tip balances the force of the other half, removing the chief cause of vibration in slotting operations.

Finer finishes and faster production result when you use SUPER'S BI-AXIAL RAKE CUTTERS in your slotting operations.

Available in a wide range of standard sizes and in special sizes on special orders.

WHATEVER YOUR CUTTING JOB LOOK FIRST TO SUPER

Carbide tipped tools for Turning, Facing, Reaming, Forming, Spot Facing, Boring, Grooving, Grinder Rests, Wear Parts, Counterboring, Shaving Centers, Special Purposes.

SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Road, Detroit 13, Michigan ★ 4105 San Fernando Road, Glendale 4, California

NONFERROUS METALS

. . . News and Market Activities

Raise Copper and Brass Castings Ceiling Price

Washington

• • • Effective Oct. 1, OPA has granted an increase of approximately 10 pct in ceiling prices for copper castings and copper base castings priced by the "base period" method. The increases are designed to bring the levels of ceilings for castings priced by the "base period" method closer to those priced by the "formula" method.

As a general rule, OPA explained, the base period pricing method is used in pricing castings that the manufacturer made during one of two base periods. The formula method, which usually provides higher ceilings than the base period method, is used in pricing items that the manufacturer did not make during the base periods. The base periods are Oct. 1 to 15, 1941, and May 11, 1942, to Jan. 31, 1943.

The increases were graduated, OPA said, so that those larger than 10 pct were provided for low-priced castings to permit broader production of low-priced items. In compensation, it was pointed out, the increases provided for higher-priced castings are smaller than those for low-priced items.

Under OPA's action, sellers who sold castings in the two base periods or who after Jan. 31, 1943, resold at prices originally established during the Jan. 1 to Sept. 30, 1941, or the Oct. 16, 1941, to May 10, 1942, period may increase net prices per pound by the following amounts: By 4c if net price before addition of the increase is less than 25c. By 3½c if net price before addition of the increase is 25.01c to 30c. By 3c if net price before addition of the increase is 30.01c to 35c. By 2½c if net price before addition of the increase is 35.01c to 40c. By 2c if net price before addition of the increase is more than 40c.

The foregoing increases, however, may not be made to ceilings for railroad journal bearings for which dollar-and-cent ceiling prices are provided under the OPA nonferrous castings regulation.

Also, the increases cannot be made to "adjusted" prices. Producers of copper and copper base castings who under individual adjustment orders issued by OPA have been permitted to increase their prices must apply these increases to their old unadjusted prices if they wish to use such prices in place of their present adjusted prices.

•

Open Market Silver Nears New Ceiling

New York

• • • As anticipated by the industry, the OPA has established a maximum price for silver, both foreign and domestic, at 71.11c per troy oz.

In the first day's trading, last Friday, the price of silver in open market transactions increased from the former controlled price for foreign silver of 45c per oz to a price of 70.11c per oz. It is anticipated that the price of silver will rise an additional penny to the ceiling within another day or so.

Order M-199 which limited the use of foreign silver was revoked on Aug. 20.

• • • The last of four articles dealing with postwar aspects of light metals and steel appears on p. 120 and covers the magnesium field.

•

Buy DPC Plant to Make Aluminum and 18-8 Pots

Canton, Ohio

• • • Purchase of the old Fort Pitt Bridge Works plant, at Massillon, from the Reconstruction Finance Corp. was revealed this week by the Massillon Aluminum Co.

A new line of aluminum pressure sauce pans and a line of stainless steel cooking utensils will be made in the plant, which trebles Massillon Aluminum's floor space. J. J. Harding, president and general manager, estimated that about 800 employees will be required when peak operations are reached at both the company's plants.

Tin Salvage Reaches 16,000 Tons by June

Washington

• • • WPB's salvage campaign between September 1942 and June 1945, netted 16,000 tons of tin, 6000 tons recovered from 567,024 gross tons of used cans and 10,000 from tinplate scrap.

The importance of the contribution of salvaged tin, WPB said, is indicated by the fact that the total tin stockpile on July 1, 1945 was 95,572 tons and of this only 20,000 tons were pure tin, the remainder being ores and concentrates that require smelting.

•

New Bolivian Tin Pact To Add to U. S. Stocks

Washington

• • • Renewal of the tin purchase agreement with the smaller Bolivian producers for the 12 months' period ending June 30, 1946, was announced by the Foreign Economic Administration on Sept. 10.

The new contract, FEA pointed out, does not cover purchases during the remainder of the year from the Patino interests in Bolivia, which are included under a separate agreement. Negotiations are under way for extension of the Patino contract into next year.

The price established for the first three months under the new contract is 63.5c a lb for refined tin in the United States, the same as under the earlier agreement. Prices during the three succeeding quarters will be scaled down to 62c, 60.5c, and 58.5c a lb, respectively.

•

Aluminum Co. Charts Postwar Metal Applications

New York

• • • The Aluminum Co. of America has just compiled a complete list of applications for aluminum based on its experience in marketing the metal. This list of established applications is expected to chart the way toward expanded peacetime consumption.

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$93 to $95
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, New York, cents per oz.	70.11
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.35
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	26.50	26.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price: 17ST and 11ST-3 screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths. ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 99 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.62½
Cartridge Brass Turnings, Loose	7.87½
Loose Yellow Brass Trimmings	7.87½

Aluminum*

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S 25S	4.50
turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.50
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	6.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 36c. per lb.; 90 to 98% Ni, 26c. per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19½
Curved	20⅝
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16½
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	—.4175
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	32.00
Zinc sulphate, 39 per cent, crystals, bbls., frt. allowed	6.35

SCRAP

. . . News and Market Activities

Market Holds Firm; Price Action Lacking

New York

• • • The market continues to mark time this week with no price changes reported from any district since last week, leaving all scrap grades at ceiling prices with the exception of blast furnace in a few districts.

While consumer demand continues strong in Pittsburgh, there are growing indications of lessened interest on the part of other consumers. This is particularly apparent this week in Boston where the market is said to be flat with merely nominal prices governing, except for orders from Pittsburgh mills. In Pittsburgh one factor in the market relationship is apparently the delay in getting war production scrap out of converted war plants and back into civilian production channels. Meanwhile, there is no civilian-production-generated scrap of significant proportions.

Detroit reports the first tonnage of auto body sheet offerings, a small lot which it is said could not be expected to grow in volume until the end of October.

There are evidences that in certain areas the supply of cast scrap is improving with respects to requirements. This is particularly apparent in Cleveland where foundries are willing to accept only A-1 cast, but, nevertheless, stove plate is reported hard to get.

Mill inventories are reported to continue low but despite this situation there is no eagerness apparent in stocking up on scrap supplies.

Yard labor is reported inadequate to meet any prospective increase in demand, if it should develop.

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PITTSBURGH — Demand continues stronger than production here, and prices are firm at previous levels as a result. No post-reconversion scrap of consequence is showing up from the factories. Complaint is being heard here over the slow handling of government scrap in shutdown warplants. Before sales are made, approval must be forthcoming from a number of offices, and several instances are reported where lots are still unsold two or three weeks after bids are closed. Military procedure is such as to make the speeding up of the process extremely difficult, and in the meantime supplies of needed charging material are lying idle in plant yards.

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CHICAGO—Prices on principal open-hearth grades remain firm with mills ordering for immediate requirements. Buying is expected this week from at least one principal consumer in line with this prevailing price situation. No further confirmation has been received of weakness in borings and mixed borings and turnings since a relatively small purchase a fortnight ago.

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PHILADELPHIA — Turnings are in very short supply. Other grades are also exhibiting strength. Shipments, however, have not been very heavy. Although mills here are taking scrap, most buying has been on a hand-to-mouth basis. Unprepared scrap has been going at lower prices because of the difficulty in obtaining labor to prepare it and not because of any market weakness. In the next few weeks large quantities of government scrap are expected to be offered. Demand for cast continues strong.

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DETROIT—This week saw the first tonnage of auto body sheets offered for sale, a comparatively small lot which was taken at ceiling. No quantities of any consequence from plants reconverted to auto production are expected until the November lists are sent out toward the end of next month. Meanwhile other scrap is moving in fair proportions, but requirements are far enough higher to maintain all prices at the ceiling.

•

BOSTON—Aside from foundry demand for cast and lukewarm steel mill buying, exclusive of Pittsburgh, the market is rather flat. Current ceiling prices are nominal. Recent buying flurry of turnings and borings was through two brokers only. At the moment, with no mill interest, the status of prices is hazy. Yards can get cars to load, but few men to load them.

•

NEW YORK—Scrap prices continued at ceilings in this market this week with all grades moving a little better than recently. The improvement is not due to a better supply of yard labor but it seems to come principally from an increased flow of scrap from producers operating once again after some reconversion curtailment.

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BUFFALO — Further tightening of steelmaking scrap supplies without important new buying featured the local market last week. One openhearth operator paid the maximum for 1000 tons of railroad material, Cleveland basis. Even light industrial grades were relatively scarce. Trade reports had it that deliveries on turnings contracts placed early in August at ceilings were almost 10,000 tons short of the mark. Demand for low phosphorus and cast iron items continued in excess of available supplies.

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ST. LOUIS — The better grades of scrap iron including heavy melting steel and specialties are still being bought by the mills in the industrial district. However, borings and turnings, locomotive tires and steel car axles are below and in slow demand. The supply is tight and shipments are off largely due to the labor shortage and cutbacks which have slowed down the industrial flow.

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BIRMINGHAM—Activity in this market is still subnormal although more material is being offered for sale as a result of contract terminations. Uncertainty over union demands and labor shortages at mills are two obstacles to increased buying.

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CINCINNATI — The scrap market in Cincinnati is holding fast to previous levels. Dealers indicate that consumers seem to be waiting until reconversion is more certainly under way before ordering. Trading on the whole is small. One district mill will be out of the market entirely because of an imminent shut down for inventory taking, and reconversion planning.

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CLEVELAND—With supply apparently the controlling factor, prices continue at ceilings here with all grades, especially machine shop turnings hard to get. Openhearth, for which there is the greatest demand, is more plentiful than some of the other grades, making the situation somewhat anomalous. Failure of one of the district's major consumers to renew his order and the fact that brokers have been cutting openhearth into 10 ft. lengths, have been factors in making the electric furnace market soft. This latter move by brokers has had a strengthening effect on the openhearth market. Foundries now want only A-1 cast and are gobbling up the better grades which are easing in supply, although stoveplate is hard to get.

All Import Controls Lifted on 11 Items

Washington

• • • Eleven additional materials including chrome and manganese ores, and mica (except bookform splittings) were removed from import control by WPB on Sept. 18.

The action, taken by revision of General Imports Order M-63, is in accordance with WPB policy of relaxing import controls as soon as possible.

The following are among items removed from Order M-63 by the amendment:

Chrome ore, corundum in grains, or ground, pulverized or refined, corundum ore, manganese ore (including ferrugunous) or concentrates and manganiferrous iron ore containing 35 pct and over of manganese mica (except bookform splittings).

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	$14.50 to 15.00
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovel, turn.	15.75*
Cast iron borings	$12.50 to 13.00
Mix. borings & turn.	12.50 to 13.00
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	22.75 to 23.25
Cut bolsters & side frames	20.25 to 21.25
Angles & splice bars	22.25*
Standard stl. car axles	25.00 to 25.50
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
No. 1 agricul. cast	20.00*
Hvy. breakable cast	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	13.06 to 14.15*

Truck delivery to foundry

Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*
Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	$9.00 to 9.50
Locomotive tires, uncut.	18.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	21.50
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	$9.50 to 10.00
Cast iron borings	11.00 to 11.50
Bar crops and plate	17.50 to 18.00
Structural and plate	17.50 to 18.00
No. 1 cast	20.00*
Stove plate	17.00
Steel axles	18.00*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	18.50 to 19.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop. turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
No. 1 cupola cast	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$16.00
No. 1 hvy. melting	16.00
No. 2 hvy. melting	15.00
No. 2 bales	$13.50 to 14.25
No. 3 bales	9.50 to 10.59
Mach. shop turn.	7.00
Elec. furn. 1 ft., und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.50
No. 2 hvy. melting	13.50 to 14.50
No. 2 bales	12.50 to 13.50
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$13.50
No. 1 hvy. melting	13.50
No. 3 bundles	11.50
Elec. furn. 1 ft., und.	17.00
No. 1 cupola cast.	20.00*

Comparison of Prices . .

Advances over past week in **Heavy Type**; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Sept. 25, 1945	Sept. 18, 1945	Aug. 21, 1945	Sept. 26, 1944
Hot-rolled sheets	2.20	2.20	2.20	2.10
Cold-rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot-rolled strip	2.10	2.10	2.10	2.10
Cold-rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tinplate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.25	2.25	2.25	2.15
Cold-finished bars	2.75	2.75	2.75	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (dollars per gross ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Pig Iron: (per gross ton)	Sept. 25, 1945	Sept. 18, 1945	Aug. 21, 1945	Sept. 26, 1944
No. 2 foundry, Phila.	$26.84	$26.84	$26.84	$25.84
No. 2, Valley furnace	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti	25.44	25.44	25.44	24.44
No. 2, Birmingham	21.38	21.38	21.38	20.38
No. 2 foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa.	26.34	26.34	26.34	25.34
Basic, Valley furnace	24.50	24.50	24.50	23.50
Malleable, Chicago†	25.00	25.00	25.00	24.00
Malleable, Valley	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Healvy melt'g steel, P'gh	$20.00	$20.00	$20.00	$17.25
Heavy melt'g steel, Phila.	18.75	18.75	18.75	15.25
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.50
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	11.75
Low phos. plate, Youngs'n	22.50	22.50	22.50	19.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.60
No. 1 cast, Chicago	20.00	20.00	20.00	22.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943 issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 25, 1945	2.42471¢ per lb.	$24.61 per gross ton	$19.17 per gross ton
One week ago	2.41571¢ per lb.	$24.61 per gross ton	$19.17 per gross ton
One month ago	2.41571¢ per lb.	$24.61 per gross ton	$19.17 per gross ton
One year ago	2.30837¢ per lb.	$23.61 per gross ton	$17.00 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.42471¢ July 3	2.21189¢ Jan. 2	$24.61 Feb. 20	$23.61 Jan. 2	$19.17	$19.17
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17	$15.67 Oct. 24
1943	2.25513¢	2.25513¢	23.61	23.61	19.17	$19.17
1942	2.26190¢	2.26190¢	23.61	23.61	19.17	$19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 8
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 9
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941 issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

. . . Prices of Finished Iron and Steel

Steel prices shown here are f.o.b. basing points, in cents per pound unless otherwise indicated. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn several pages.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars [10]	DELIVERED TO Detroit	DELIVERED TO New York	DELIVERED TO Philadelphia
SHEETS															
Hot-rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold-rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.31¢	3.77¢
Long ternes [2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot-rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold-rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity cold-rolled	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)					3.05¢	3.31¢	
TINPLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
Electro, box 0.25 lb	$4.35	$4.35	$4.35												
Electro, box 0.50 lb	$4.50	$4.50	$4.50						$4.60						
Electro, box 0.75 lb	$4.65		$4.65						$4.75						
BLACKPLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ [11]			3.37¢
TERNES, MFG															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		(Duluth=2.35¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel [6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold-finished [8]	2.75¢	2.75¢	2.75¢	2.75¢		2.75¢		(Detroit=2.80¢)			(Toledo=2.90¢)			3.09¢	3.07¢
Alloy, hot-rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton=2.70¢)					2.80¢		
Alloy, cold-drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont=2.25¢)							
Carbon steel [12]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.83¢
Alloy	3.50¢	3.50¢			(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.59¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem=2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9]															
Bright [13]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester=2.95¢)		(Duluth=2.90¢)			3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (high carbon)	3.35¢	3.35¢		3.35¢			(Worcester=3.45¢)					3.85¢			3.67¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

SEMIFINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3.00 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12.00 higher. Provo, $11.20 higher. Delivered prices do not reflect 3 pct tax on freight rates.

	Per Gross Ton
Rerolling	$36.00
Forging	42.00

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton $54.00

Price delivered Detroit $2.00 higher; East Michigan, $3.00 higher.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Openhearth or bessemer	$36.00

Judge a coolant pump by the company it keeps

You can best judge a coolant pump by finding out who uses it.

Ruthman Gusher Coolant Pumps are installed as standard equipment by many of the leading manufacturers of machine tools all over the world. Experience has taught them that Ruthman Coolant Pumps give dependable long service with minimum maintenance cost.

These satisfied customers are your best guarantee of the service which Ruthman Gusher Coolant Pumps will give you. Specify Ruthman Pumps for all your coolant needs.

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WRITE US NOW FOR CATALOG

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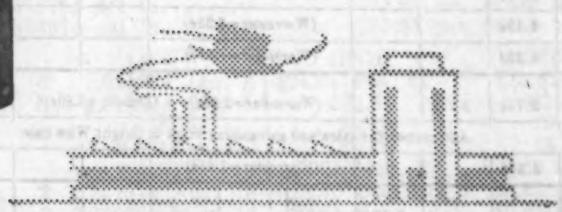

THE RUTHMAN MACHINERY CO.

1821 READING ROAD CINCINNATI 2, OHIO

THE "GUSHER"

A MODERN PUMP FOR MODERN MACHINE TOOLS

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.15c.
Worcester, Mass.	2.25c.
Birmingham	2.15c.
San Francisco	2.65c.
Galveston	2.40c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	Base per Lb.
Cut spikes	3.25c.
Screw spikes	5.40c.
Tie plate, steel	2.30c.
Tie plates, Pacific Coast	2.45c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse. *Also Canton, O.)*

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium*	43c.
Oil hardening*	24c.
Special carbon*	22c.
Extra carbon*	18c.
Regular carbon*	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	Base per Keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	83
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.768[a]	$3.922	$4.772	$3.605	$3.666	$3.822	$4.172	$5.816	$6.366	$7.072	$8.172
New York	3.59	4.613[2]	5.110	3.974[6]	4.772	3.768	3.758	3.853	4.203	5.858	6.408	7.103	8.203
Boston	3.744	4.744[9]	5.224[9]	4.108	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.902	4.152	....	....	....	....
Norfolk	3.771	4.965	5.371	4.168	4.965	3.971	4.002	4.065	4.265	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.35	3.35	3.50	3.85	5.50	6.85	6.65	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.387	3.387	3.537	3.987	5.537	6.887	6.687	7.987
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.568	3.35	3.85	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.75[4]	3.819	4.669	3.53	3.40	3.35	3.85	5.50	6.65	6.65	7.75
Detroit	3.45	4.50	5.004	3.70	4.859[17]	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475[3]	4.825[3]	3.675	4.711	3.561	3.691	3.511	4.111	5.95	7.00	7.011	8.231
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.597	3.697	3.647	4.131	5.961	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.85	5.80	6.85	6.65	7.90
St. Paul	3.50	4.48	5.257[4]	3.86	5.182[17]	3.813[3]	3.813[3]	3.763[3]	3.461	5.94	6.99	7.361	8.461
Omaha	3.965	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.543	....	....	....	....
Indianapolis	3.518	4.568	4.918	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.53	....	....	....	....
Memphis	3.965[7]	4.86	5.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058[a]	5.079	5.358	4.308	....	4.158	4.158[a]	4.108[a]	4.729	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.473[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20[3]	6.10[4]	4.95	5.813[18]	4.95	4.65	4.40	5.883	8.204	9.404	9.304	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.433	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.883	....	9.404	....	....
Portland	4.65[11]	8.60[4]	5.75[4]	4.75[11]	....	4.95[11]	4.45[11]	4.45[11]	5.833	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.17[13]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	6.00	....	....	....	....

National Emergency Steels

MILL EXTRAS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9427	0.75¢	$15.00	$1.25	$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00					
NE 8642	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
					NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00					
NE 8727	0.70	14.00	1.20	24.00	NE 9830	1.30	28.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	28.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9835	1.30	28.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	28.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	28.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	28.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	28.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	28.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	28.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.55	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7000 lb. irrespective of size. **Note 2:** For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. **Note 3:** When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. **Note 4:** The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.27¢a. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

Per Gross Ton

Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

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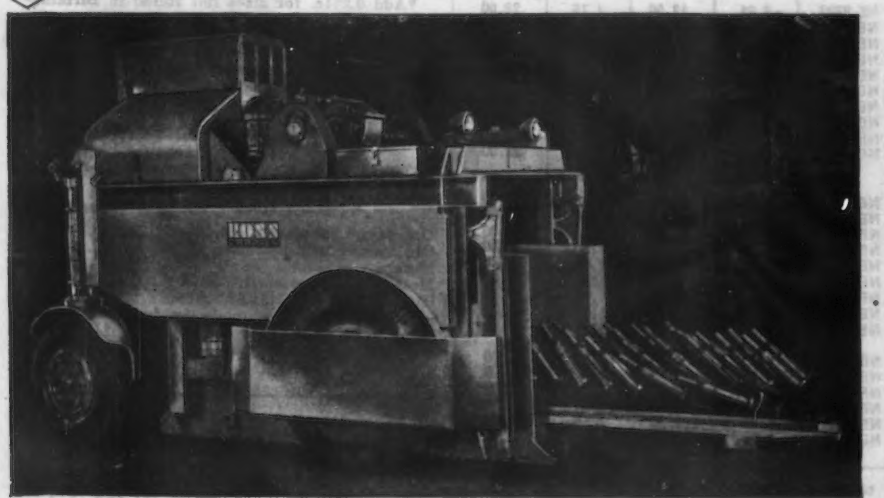
Series 70 Straddle Carrier offers an economical solution to the ever-present problem of handling materials with maximum speed, at rock-bottom cost. Handles heavy, palletized loads with utmost efficiency over rough ground, through mud or snow. Maneuvers easily in crowded quarters . . . Get the details about how Ross Series 70 Straddle Carrier can reduce *your* materials-handling costs. Write today—ask for Bulletin IA-95.



THE ROSS CARRIER COMPANY • Benton Harbor, Michigan
Direct Factory Branches and Distributors Throughout The United States and Canada

ROSS
HEAVY DUTY MATERIALS-HANDLING EQUIPMENT

PRICES

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills
(F.o.b. Pittsburgh only on wrought pipe) base price—$200.00 per net ton

	Black	Galv.
Steel (buttweld)		
⅛-in.	63½	51
¼-in.	66½	55
1-in. to 3-in.	68½	57½
Wrought Iron (buttweld)		
⅛-in.	24	3½
¼-in.	30	10
1-in. and 1¼-in.	34	16
1½-in.	38	18½
2-in.	37½	18
Steel (lapweld)		
2-in.	61	49½
2½-in. and 3-in.	64	52½
3½-in. to 6-in.	66	54½
Wrought Iron (lapweld)		
2-in.	30½	13
2½-in. to 3½-in.	31½	14½
4-in.	33½	18
4½-in. to 8-in.	32½	17
Steel (butt, extra strong, plain ends)		
⅛-in.	61½	50½
¼-in.	65½	54½
1-in. to 3-in.	67	57
Wrought Iron (same as above)		
⅛-in.	25	6
¼-in.	31	12
1-in. to 2-in.	38	19½
Steel (lap, extra strong, plain ends)		
2-in.	59	48½
2½-in. and 3-in.	63	52½
3½-in. to 6-in.	66½	56
Wrought Iron (same as above)		
2-in.	33½	15½
2½-in. to 4-in.	39	22½
4½-in. to 6-in.	37½	21

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or $2 a ton higher on all buttweld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect 3 pct tax on freight rates.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, Minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots.

	Seamless Cold-Drawn	*Seamless Hot-Rolled*	*Lapweld, Hot-Rolled*
2 in. O.D. 13 B.W.G.	15.03	13.04	12.35
2½ in. O.D. 12 B.W.G.	20.21	17.54	16.58
3 in. O.D. 12 B.W.G.	22.48	19.50	18.35
3½ in. O.D. 11 B.W.G.	26.37	24.62	23.15
4 in. O.D. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb or ft and over	Base
30,000 lb or ft to 39,999 lb or ft	5 pct
20,000 lb or ft to 29,999 lb or ft	10 pct
10,000 lb or ft to 19,999 lb or ft	20 pct
5,000 lb or ft to 9,999 lb or ft	30 pct
2,000 lb or ft or 4,999 lb or ft	45 pct
Under 2,000 lb or ft	65 pct

Corrosion and Heat Resisting Steel

(Base price, cents per pound, at points indicated: P—Pittsburgh; Ch—Chicago; Cl—Cleveland; C—Canton; M—Middletown, O.; Sy—Syracuse; D—Dunkirk; W—Watervliet; N—Newark, N. J.; B—Baltimore; R—Reading; Y—Youngstown; F—Ft. Wayne; P—Philadelphia)

Chromium-Nickel Alloys

	No. 304	No. 302
Ingot, P,Ch,C,B,R,y	Subject to	negotiation
Blooms, P,Ch,C,R,y	21.25	20.40
Slabs, P,Ch,C,B,R,y	21.25	20.40
Billets, P,Ch,C,N,W,Sy,B	Subject to	negotiation
Billets, forging, P,Ch,C,D,B,R,y	21.25	20.40
Bars, h-r,P,Ch,C,D,W,N,Sy,B,R,F	25.00	24.00
Bars, c-f,P,Ch,Cl,C,M,D,N,Sy,B, R,F	25.00	24.00
Plates, P,M	29.00	27.00
Shapes, structural, P,Ch	25.00	24.00
Sheets, P,Ch,M,C	36.00	34.00
Strip, h-r,P,Ch,R,C,y	23.50	21.50
Strip, c-r,P,Cl,N,R,C,y	30.00	28.00
Wire, c-d, Cl,D,Sy,B,R,C	25.00	24.00
Wire, flat, c-r,Cl,B	30.00	28.00
Rod, h-r,N,Sy	25.00	24.00
Tubing, seamless, P,Ch,C (4 in. to 6 in.)	66.63	66.63

Straight Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
Ingot, P,Ch,C,B,R,y	Subject to		negotiation	
Blooms, P,Ch,C,R,y	15.725	16.15	19.125	23.375
Slabs, P,Ch,C,B,R,y	15.725	16.15	19.125	23.375
Billets, P,Ch,C,N,W, Sy,B	Subject to		negotiation	
Billets, forging, P,Ch, C,D,B,R,y	15.725	16.15	19.125	23.375
Bars, h-r,P,Ch,C,D,W, N,Sy,B,R,F	18.50	19.00	22.50	27.50
Bars, c-f,P,Ch,Cl,C,M, D,N,Sy,B,R,F	18.50	19.00	22.50	27.50
Plates, P,M	21.50	22.00	26.50	30.50
Shapes, structural, P,Ch	18.50	19.00	22.50	27.50
Sheets, P,Ch,M,C	26.50	29.00	32.50	36.50
Strip, h-r,P,Ch,R,y,C	17.00	17.50	24.00	35.00
Strip, c-r, P,Cl,N,R,y,C	22.00	22.50	32.00	52.00
Wire,c-d,Cl,D,Sy,B,R,C	18.50	19.00	22.50	27.50
Wire, flat, c-r,Cl,B	22.00	22.50	32.00	52.00
Rod, h-r,N,Sy	18.50	19.00	22.50	27.50
Tubing, seamless, P,Ch,C (4 in. to 6 in.)	.....	63.30	.....	.....

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00*
Sheets	19.00

*Includes annealing and pickling.

EXCEPTIONS TO RPS 6

Ingots, carbon, rerolling—Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10. Granite City Steel, $39.45.

Ingots, carbon, forging—Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., $38.10.

Ingots, alloy—C/1 delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Slabs, per gross ton—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50; Kaiser Co., (rerolling) $58.64, (forging) $64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) $41; (forging) $47; Pgh. Steel Co. (rerolling) $38.25, (forging) $44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) $58.64, (forging) $64.64 (shell steel) $74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto, Ohio; Phoenix Iron Co. $47 mill; Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50; Kaiser Co. $64.64, (shell steel) $74.64, f.o.b. Los Angeles.

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ACCESS DOORS • AIR DOORS • BURNER BLOCKS • FURNACE OBSERVATION WINDOWS

PRICES

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at $39 base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.60 Birmingham; Ford Motor Co. $34 Dearborn, Mich.; Geneva Steel Co. $58.64 f.o.b. Pacific Coast; Pgh. Steel Co. $43.50; Kaiser Co. $58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Rails, per gross ton—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.35c. produced on DPC eqpt., 2.35c. otherwise; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.35c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.ob Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel, Benwood, 2.05c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.35c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh e.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo e.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo e.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago e.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel, 2.25c. Parkersburg. Granite City Steel 2.43c.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 3.85c. Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

PIG IRON PRICES

BASING POINT* BASE PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$25.50	$26.00	$26.50	$27.00	.....
Birdsboro	25.50	26.00	26.50	27.00	$30.50
Birmingham	20.00	21.38	.....	28.00	.....
Buffalo	24.00	25.00	25.50	26.00	30.50
Chicago	24.50	25.00	25.00	25.50	.....
Cleveland	24.50	25.00	25.00	25.50	.....
Detroit	24.50	25.00	25.00	25.50	.....
Duluth	25.00	25.50	25.50	26.00	.....
Erie	24.50	25.00	25.50	26.00	.....
Everett	25.50	26.00	26.50	27.00	.....
Granite City	24.50	25.00	25.00	25.50	.....
Hamilton	24.50	25.00	25.00	.....	.....
Neville Island	24.50	25.00	25.00	25.50	.....
Provo	22.50	23.00	.....	.....	.....
Sharpsville†	24.50	25.00	25.00	25.50	.....
Sparrows Point	25.50	26.00	.....	.....	.....
Steelton	25.50	.....	.....	.....	30.50
Swedeland	25.50	26.00	26.50	27.00	.....
Toledo	24.50	25.00	25.00	25.50	.....
Youngstown	24.50	25.00	25.00	25.50	.....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.00	$26.50	$27.00	$27.50	.....
Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$34.52
Brooklyn	Bethlehem	2.50	26.00	26.50	29.00	29.50	.....
Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	33.42
Canton	Cleveland	1.39	25.89	26.39	26.39	26.89	.....
Canton	Buffalo	3.19	.....	.....	.....	.....	33.69
Cincinnati	Birmingham	4.06	24.06	25.44	.....	.....	.....
Cincinnati	Hamilton	1.11	.....	.....	26.11	.....	.....
Cincinnati	Buffalo	4.49	.....	.....	.....	.....	34.99
Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	.....
Jersey City	Birdsboro	1.94	.....	.....	.....	.....	32.44
Los Angeles	Provo	4.95	27.45	27.95	.....	.....	.....
Los Angeles	Buffalo	15.41	.....	.....	.....	.....	45.91
Mansfield	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	.....
Mansfield	Buffalo	3.36	.....	.....	.....	.....	33.86
Philadelphia	Swedeland	.94	26.34	26.84	27.34	27.84	.....
Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	31.74
San Francisco	Provo	4.95	27.45	27.95	.....	.....	.....
San Francisco	Buffalo	15.41	.....	.....	.....	.....	45.91
Seattle	Provo	4.95	27.45	27.95	.....	.....	.....
Seattle	Buffalo	15.41	.....	.....	.....	.....	45.91
St. Louis	Granite City	.50	25.00	25.50	25.50	26.00	.....
St. Louis	Buffalo	7.07	.....	.....	.....	.....	37.07

* Maximum per gross ton, established by OPA February 14, 1945. † Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackson, Ohio—$30.50; f.o.b. Buffalo—$31.75. Add $1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add $1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, ¢ per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh	21½¢ to 23½¢
Copper, reduced, 150 and 200 mesh	20½¢ to 25½¢
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢
Aluminum, 100 and 200 mesh	*25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	$1.40
Chromium, 100 mesh and finer	$1.25
Lead, 100, 200 & 300 mesh	11½ to 15¢
Manganese	65¢
Nickel, 150 mesh	51½¢
Solder powder, 100 mesh	31½¢ plus metal
Tin, 100 mesh	58¾¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb	$2.60
Under 100 lb	$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, By-Product	
Chicago, del'd	13.75
Chicago, f.o.b.	13.00
New England, del'd	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd	13.38
Buffalo, del'd	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd	13.15
Cleveland, del'd	13.30
Cincinnati, del'd	13.35
St. Louis, del'd	14.25
Birmingham, del'd	10.90

* Hand drawn ovens using trucked coal permitted to charge $8.60 per ton plus transportation charges.

80% of all Small Shop Saws are "Marvels"!

No. 1 Draw Cut Hack Saw. Dry cut, 4" x 4" capacity. A sturdy saw with well-known dependability, economy, and invaluable service in the small shop or shop department. Simple and efficient with low original, maintenance, and blade cost.

MARVEL SAWS

No. 2 Draw Cut Hack Saw. Companion to the No. 1 but with a normal 6" x 6" capacity which can be increased to 8" x 8" by shortening the stroke with adjustable crank. The No. 2 MARVEL also has a swivel vise which is removable from the "T" slotted bed. Permitting special fixtures to be mounted. Both machines are available in belt and motor driven models. Motor driven models can also be furnished mounted on portable truck.

Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

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XLO MUSIC WIRE in all standard sizes from .003" to .200". In units of ¼ lb., ½ lb., 1 lb., 5 lb., or catch-weight coils.

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● WRITE today for complete information on the CONCO line of hand-powered and electric cranes, hoists and trolleys — a complete line, tried and proven for over twenty years. CONCO engineers are qualified to recommend the right type of handling equipment for faster, more economical production in your shop. Write us now, and take advantage of our long experience in moving more materials, faster and at less cost.

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PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	Consumer
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	Consumer Per Cent Off List
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.30c.
Armature	3.65c.
Electrical	4.15c.
Motor	5.05c.
Dynamo	5.75c.
Transformer 72	6.25c.
Transformer 65	7.25c.
Transformer 58	7.75c.
Transformer 52	8.55c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	32c.
L.c.l. lots	34c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.35c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si.	8.90c.	9.05c.	9.55c.
90-95% Si.	11.05c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr. 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10%	13.00c.	13.40c.	14.00c.
62-66% Cr, 5-7% C	13.50c.	13.90c.	14.50c.

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Bulk	Ton Lots	Less Ton
0.10% max. C, 1 or 2% max. Si	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.20c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.35c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot	45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

Other Ferroalloys

Ferrotungsten. Standard grade lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. York, Pa., per lb. contained tungsten, 10,000 lb. or more — $1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.

Open hearth	$2.70
Crucible	$2.80
Primos	$2.90

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal — $1.50

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5 — $1.10

Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots	25c.
2000 lb. to carload	26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots	58c.
2000 lb. to carload	59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1	87.5c.
No. 6	60c.
No. 79	45c.

Bertram, f.o.b. Niagara Falls

Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.

2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30

Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti

Less ton lots	$1.23
	$1.25

Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per lb. contained titanium

Less ton lots	$1.35
	$1.40

High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed East of Mississippi River, north of Baltimore and St. Louis, per carload — $142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton — 58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Sigio), Tenn., $3 unitage freight equalized with Nashville, per gross ton — $75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo. — 95c.

Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo. — 80c.

Molybdenum oxide briquets, 48-52% Mo. f.ob. Langeloth, Pa. per lb. contained Mo — 80c.

Molybdenum oxide, in cans, f.o.b Langeloth and Washington, Pa. per lb. contained Mo — 80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales

Carload lots	14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

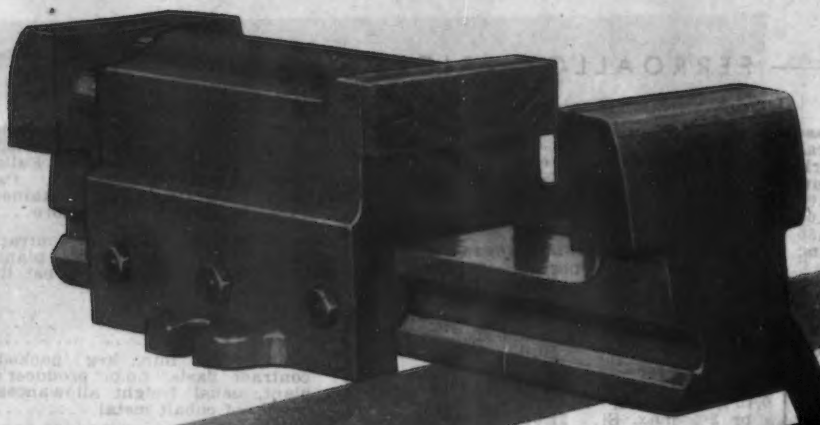
Carload, bulk	4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk

Ton lots	5.75c.
	7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots	8.00c.
Ton lots	8.75c.
Less ton lots	9.25c.



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- MAXIMUM OPENING 4"
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- ONE STROKE OF PEDAL = 3/16 STROKE OF VISE JAW

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Precision Alignment
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• Tests prove that the Agerstrand Hydraulic Vise reduces handling time 52%,—because it eliminates waste motion. Foot pedal operation frees the hand from old-style handle or lever, giving the employee greater productivity. Work is firmly secured and quickly released with a touch of the foot. For faster production and increased profits, order an Agerstrand Vise today.

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